

In This Issue—*Development of a Modern Service Station*

108 24 96833 L.C. 65

MOTOR AGE

Vol. XLIII
Number 9

PUBLISHED WEEKLY AT THE MALLERS' BUILDING
CHICAGO, MARCH 1, 1923

Thirty-five Cents a Copy
Three Dollars a Year



Fewer Champion Types Mean Greater Dealer Profit

Progress in motor standardization has made possible the reduction of the Champion Blue Box Line to *seven numbers*. These seven types cover the requirements of every engine made in quantity. The Champion X and Champion X Long meet the needs of Ford cars, trucks and tractors.

With the very minimum investment, the Champion dealer can now carry stock to meet absolutely all calls. His stock turns faster and makes him more profit if he carries the full line of dependable Champion Spark Plugs.

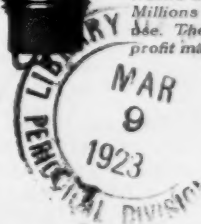
Champion Spark Plug Company, Toledo, Ohio

Champion Spark Plug Company of Canada, Limited, Windsor, Ontario

*Only One Spark Plug is Entitled to the Name Champion.
You Can Identify It by the Double-Ribbed Core*



Champion X is the one spark plug recognized as the standard for Ford cars, trucks and tractors. Millions are in daily use. They are a sure profit maker for you.



CHAMPION

Dependable for Every Engine

TL1
.M9

Thoma Sunbeam VISOR Made of VITROLITE



AN EXCLUSIVE SUNBEAM FEATURE



Vitrolite tops the Sunbeam line of Visors for 1923. Produced only by The Vitrolite Company and marketed exclusively by THOMA & SON, INC., Vitrolite is made in quarter-inch panels Royal Purple and Green; is very beautiful in appearance—of outstanding quality—to please the most exacting taste.

Vitrolite is a perfect Visor material—what your customers want. Write for further information and dealers' prices.

SUNBEAM "G" VISOR--(Green & Amber Glass)

The popular priced Sunbeam Visor for popular priced cars. A high quality glass visor—neatly designed, easily installed and assures absolute satisfaction. Full standard

assembly frame and brackets, with Thoma Process quarter-inch Green and Amber Ribbed Glass. This is a Visor car owners will appreciate, affords quick turnover.

SUNBEAM JUNIOR For All Ford Models

Made of high grade materials, matches the windshield assembly, easily installed and is a Visor that the Ford owner is demanding. Furnished only in Thoma Process quarter-

inch ribbed glass in Green and Amber. Price—\$8.00; West of Rockies—\$10.00.

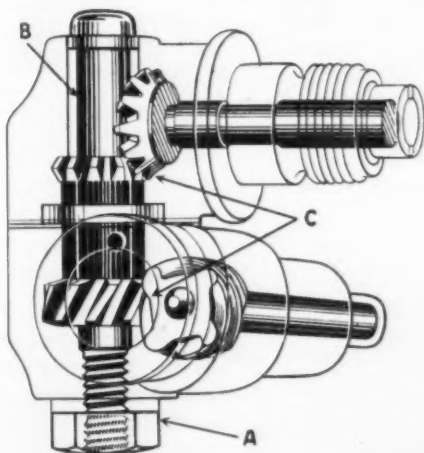
Sold by Leading Jobbers Everywhere

MANUFACTURED BY

THOMA & SON-INC.
Everything in
Glass for the Automobile

FAIRFIELD, IOWA

WINDSHIELDS AND BODY GLASS—"THOMA CERTIFIED QUALITY"



Trouble Eliminated in the New Stewart Swivel-Joint for Ford Model Speedometer

No more trouble with the improved Stewart Swivel Joint. The lock-nut (A) holds the draw-pin (B) firmly in place so that the gears (C) are prevented from slipping out of mesh:

This lock-nut and draw-pin also prevent the two swivel-joint halves from loosening and coming apart, which would cause failure of the speedometer to register correctly.



Price \$15.00
WESTERN PRICE \$15.50

The colored dials in the Ford model 160 turn up at various mileages to remind the car owner to oil and grease parts of his car, indicated on a small chart furnished with each speedometer.

Stewart-Warner Speedometer Corporation
Chicago, U. S. A.

Stewart
CUSTOMBILT ACCESSORIES
USED ON 8 MILLION CARS

Look for the Red Tag

CAUTION

This tag is attached to all genuine Stewart Repair Parts for your protection.

LOOK FOR IT!

If you don't find this tag, you are getting imitation substitute parts. Refuse to accept them.

The use of imitation parts on any Stewart Product, at our option, invalidates the Stewart guarantee on the entire article.

STEWART-WARNER SPEEDOMETER CORPORATION

LOOK FOR THE RED TAG
on all Genuine Stewart Repair Parts.
It protects you against imitations.

GK 7 May 23

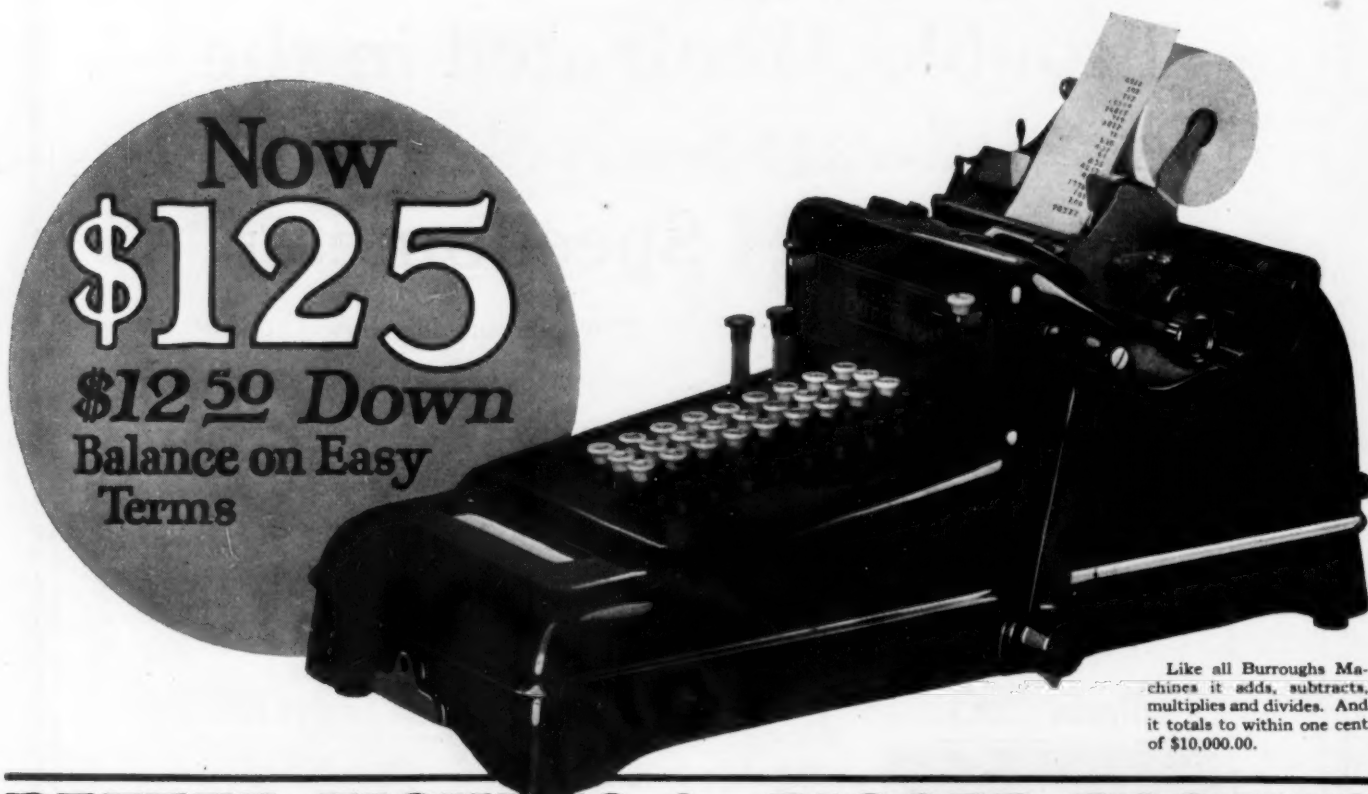
1928 14/15/26

This Burroughs Saves So Much And it Costs So Little!

On your counter—it will total cash sales and give you the right answer in less time, every time.

In your office—it will help you check your charge slips, classify your sales, purchases, expenses, costs and give you the figures you would like to have but are not getting now—the figures you need every day to make more money.

The progressive automotive retailers of America lead all other classes of dealers in the use of figuring machines for better business control and better profits. And the largest proportion of these figuring machines are made by Burroughs and backed by Burroughs Service. Ask any user if his Burroughs doesn't help him to save money and manage his business better.



Like all Burroughs Machines it adds, subtracts, multiplies and divides. And it totals to within one cent of \$10,000.00.

BETTER FIGURES *for* BIGGER PROFITS

Burroughs

ADDING • BOOKKEEPING • BILLING • CALCULATING MACHINES

All over the United States, in the stores of little tire and accessory dealers, or the biggest car dealers, in garages, in the automobile and parts factories, in the warehouses of auto supply jobbers, you'll see Burroughs Machines of many styles.

They give invaluable help to their owners in speeding up statements and collections, watching depart-

ment expense, getting proper turnover on their stock, getting quick and accurate figures for the banker or income tax collector and stopping many little leaks and losses that eat up profits.

No progressive man today should be without at least the handy little "general purpose" machine shown above.

Burroughs Adding Machine Co.,
6012 Second Blvd., Detroit, Mich.

Please send me more information about your \$125 machine.

☐ Garage ☐ Car Dealer ☐ Accessories Store

Name.....

Address.....

MOTOR AGE

Published Every Thursday by
THE CLASS JOURNAL COMPANY
 MALLERS BUILDING
 59 East Madison Street,
 CHICAGO, ILLINOIS, U. S. A.

Vol. XLIII Chicago, March 1, 1923 No. 9

CONTENTS

What a Small Town Dealer Can Learn From the Detroit Oakland Company.....	9
<i>By B. M. Ikert</i>	
Recent Developments in Automotive Industry.....	13
The Development of a Modern Service-System.....	15
<i>By Don T. Hasting</i>	
A Sales Department With a Definite Program.....	19
<i>By Dayton Keith</i>	
A Square Deal in the Electrical Shop.....	20
What Is This Used Car Problem?.....	23
Motor Ages' Picture Pages of Automotive Interest.....	24
Editorials—	
Battery Ethics	26
Tire Prices	26
Courtesy—A Strange Word to You?.....	26
Straight Shooting	27
Logic in Trouble Shooting.....	27
What the Schools Need.....	27
News—	
Atlanta Show Stirs Southern Sales.....	28
Columbus, O., Show Is Notable Success.....	28
Murphy Sets Record at 115 M. P. H.....	29
Some Makers Approaching Capacity Production.....	29
Twenty-six Cars Enter Fuel Consumption Race in France.....	30
Car and Truck Output of Past Month Greater Than Year Ago.....	30
Chevrolet Starts Production at Janesville Plant.....	31
Merger of American Motors With Bessemer Co. Approved.....	31
Illinois Motor Vehicle Law Made Target of Legis- lators.....	32
Retail Sales in Milwaukee Much Heavier Than Last Year.....	32
78 Bills Aimed to Regulate Automobiles in Cali- fornia.....	33
Methods of Increasing Fuel Economy Explained by S. A. E.....	33
South Dakota Assn. Acts Against "Trading Allow- ance".....	34
Visiting Dealers Entertained at Eleventh Kalamazoo Show.....	34
"Dealers' Day", Shining Event of Dallas Show.....	35
Another Tire Price Increase, Makers' Belief.....	35
1904 Reo Leads Parade of Company's Many Old Models.....	36
Business Notes	37
Concerning Men You Know.....	38
In the Retail Field.....	39
The Readers' Clearing House—	
Preparing Storage Batteries for Dry Storage.....	40
Look Ahead Before Starting to Build.....	41
Evinrude Engine to Drive Generator.....	42
Simms-Huff Generator Circuits.....	43
Overland Carburetion and Wiring.....	44
Chevrolet Rear Axle Adjustments.....	45
Boosting Accessory Sales.....	46
Accessory Dealers I Have Met.....	47
Coming Events	48
Squeeks & Rattles.....	48
Specifications of Trucks, Tractors and Passen- ger Cars	49-54

Index to Advertisers Next to Last Page.

SUBSCRIPTION RATES

United States, Mexico and U. S. Possessions.....	\$ 3.00 per year
Canada	5.00 per year
All Other Countries in Postal Union.....	6.00 per year
Single Copies	35 cents

Subscriptions accepted only from the Automotive Trade

Entered as Second Class Matter Sep* 19, 1899, at the Post Office
 at Chicago, Ill., under Act of March 6, 1879.



Suits Everybody!

A complete line of tires
 —one for every size and
 purpose—built to one
 quality—standard the
 highest—each TIRE
 priced to make it a
 greater dollar for dollar
 value — measured by
 the one test—the cost
 of miles.

A merchandising plan
 that has the interest of
 the dealer always in
 view.

A co-operative selling
 plan that is flexible
 enough to fit the needs
 of smallest town or
 largest city dealer.

THAT IS THE GOODRICH
 PROPOSITION FOR 1923.
 INVESTIGATE IT

The
 B. F. GOODRICH RUBBER CO.
 Akron, Ohio

Goodrich TIRES

"BEST IN THE LONG RUN"

Cooper Products

TIRES • BATTERIES



Take a Profit the Year 'Round

Now—dealers are offered a real plan to cut out dull, non-productive seasons and make every month show a profit. Cooper Super-Size Cord Tires and Cooper Batteries give you a twelve month selling season—tires in summer, batteries in winter. Cooper Cords have won national distribution because they are built for service. We know that repeat business is necessary to dealer profits so we build Cooper Cords to yield the service that makes motorists come back for more. In this there's profit for you.

Write for Money-Making Cooper Dealer Plan

Here's the greatest profit opportunity open to dealers today. Figure it out yourself. Do you want to make money twelve months out of the year or just six months?

There's only one answer and only one profit proposition **AND WE OFFER IT TO YOU.**

Write or wire—get the facts.

The Cooper Corporation

General Offices, Cincinnati, Ohio



For FORDS—the new Cooper "Rubber Enclosed" type battery for Ford Cars is strictly a Cooper quality product. Special shock absorbing bottom minimizes shock and vibration. Every Ford owner needs one. The Cooper Corporation is probably the only manufacturer of storage batteries making all of the principal parts in own factories.

The Cooper Corporation is the only organization of its kind in the accessory field producing the two greatest units in motor car equipment—Tires, Batteries.





The Publisher's Service Station

Rendering Service to Help You Render Service



Are You Going It Alone?

Last summer, a member of MOTOR AGE staff visited a small town near Chicago. He happened into the establishment of a repairman which, to be brief, was the worst-looking place he had ever seen. The man was alone in the town and in his work; he employed no helpers; he sold no car—just a few stray accessories that he had picked up at fire sales in the city.

The MOTOR AGE man had a short chat with the dealer and, during the conversation, asked the man if he had ever read our paper. Not knowing (and very likely, not caring) that his questioner was connected with this paper, he replied, "Nope! Never have read it only once or twice—the ideas in a paper like that are too costly for a fellow in a small town like this, they don't care much about things here."

Later, when there was an opening in the conversation, the MOTOR AGE man asked, "Do you think you could make a go of it in a big city with a shop like this?"

"No," was the reply, "there is too much high class competition in a big city, but here, I am 'going it alone' and the folks are satisfied with what I have to offer."

That was last summer. Not long ago, the same man again visited this town and naturally was interested in the "garage" he had encountered on his previous visit. Today, there is a furniture shop in the old place and, we think, the same tools and equipment that the automobile man used are still there.

The answer—A new garage, handling a popular make of car and an excellent service department with a complete stock of accessories. The new man is not "going it alone" and does not believe that modern merchandising ideas such as MOTOR AGE gives him are costly anywhere—in fact, he KNOWS that they're not because he is applying them every day in a score of ways to his business and he is going big.



Already Nash Is Setting New Sales Records

Our sales figures tabulated as of February 15th, show that during the first month and a half of 1923, Nash shipped more cars than during the entire first quarter of 1922.

Reports being received weekly from Nash dealers throughout the country reveal that they are doing the greatest business in their history at this season.

And confirming these facts is the further fact that at the Motor Shows in New York, Philadelphia, Chicago, Pittsburgh, St. Louis, Buffalo, Charlotte, Atlanta, Cleveland, Kansas City, and other centers, all Nash records for bona fide retail sales have been surpassed.

Good will toward the Nash name and the Nash line is now a far greater good will than ever before.

The Company is proceeding vigorously and unswervingly toward a place of even higher prominence in the industry.

And the Nash franchise is daily becoming of more and more value as a permanent and profitable business opportunity.

If you are anxious to improve your place in the automobile business, do a little serious thinking about putting your name in partnership with the name Nash. Write us today about dealer territory.

NASH

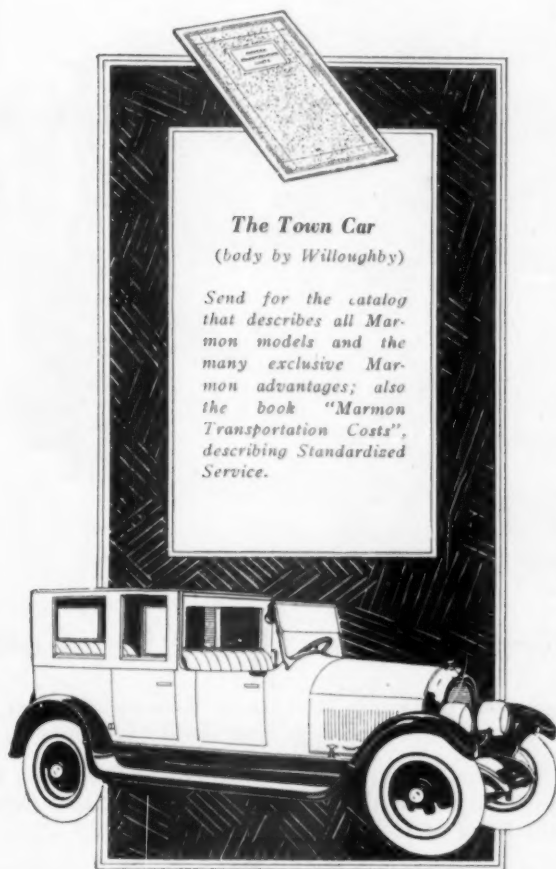
THE NASH MOTORS COMPANY
KENOSHA, WISCONSIN

Nash Leads the World in Motor Car Value

(1239)

Why Guess at Profits?

There are so many people in your territory. To how many of them can you sell cars? And what will your profits be at the end of the year?



If you were a Marmon dealer you would *know*. For there is no speculating about Marmon profits no matter where the territory. The Marmon Sales Extension Division has evolved a set of basic principles on which an accurate *forecast* of the Marmon business in any territory can be made.

This analysis will show you that you will make more money with Marmon than with any other Fine Car. For Marmon performance—plus Marmon economy—appeals to a far wider range of buyers.

Do you want to know what your profits will be this year? Write, and we will tell you.

NORDYKE & MARMON COMPANY

Established 1851

INDIANAPOLIS

Address Inquiries to Dept. A

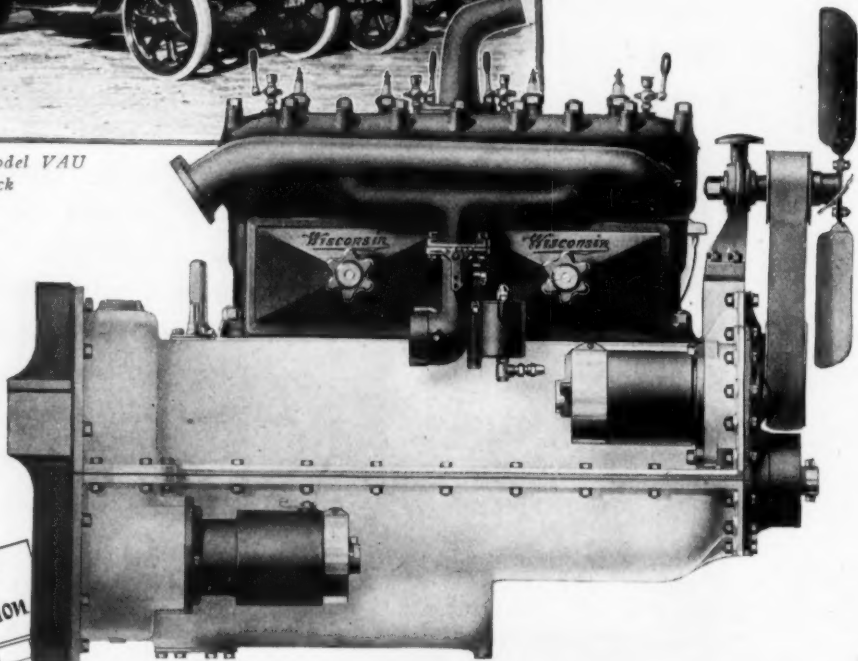
MARMON

The Foremost Fine Car

This is the thirty-fourth of a series of fifty-two advertisements appearing in this publication.



Wisconsin Motor Model VAU
in Maccar Truck



Bring Down Operating Costs

You can sell the truck that has a Wisconsin motor on the operation and maintenance cost sheets of users.

These are the figures that are the *most* interesting to your "prospect" because the cost of keeping a truck running is the real basis of its value to him.

Wisconsin motors are designed by practical engineers who never forget the value of accessibility and standard construction.

They weigh less per horsepower resulting in lighter vehicles that make greater pay loads possible.

A complete and efficient service department at factory and branches.

Offices in New York,
Cleveland, Chicago,
Los Angeles, Seattle.

WISCONSIN MOTOR MFG. CO.
MILWAUKEE,

WISCONSIN

Wisconsin

CONSISTENT

MOTOR AGE



What a Small Town Dealer Can Learn From the Detroit Oakland Company

There Are Fourteen Things Which This Company Does and Which Are Applicable Wherever There Is a Desire to MAKE MAINTENANCE PAY. Particular Attention Is Paid to Retaining Good Will of Old Customer and Making Friends of New

By B. M. IKERT

THERE are fourteen things which the Detroit Oakland company does in its selling of maintenance applicable wholly or in part to the maintenance department of the small town dealer. Not that we need to confine the applicability of what the Detroit company does to the small town dealer, because many a large town dealer can take a hint from the company's methods and use them to advantage.

But it is particularly the small town dealer we wish to reach in this follow-up of the Detroit Oakland company article printed in the February 15 issue of MOTOR AGE, because too often it is said that the dealer in the smaller towns and communities is up against a totally different proposition and that practices of the large town institutions are not applicable to the small town conditions.

Except in the volume of work done, there is no differ-

ence in the theory of selling maintenance, no matter what the size of the town or the dealer's organization, extent of his business or potential possibilities. A friendly greeting is just as effective in the 60 by 100 ft. building of the dealer in Podunk as it is in the block-square building of the dealer in the city of a million people.

As a matter of fact, the dealer in the small town is in a better position to practice the things which have proven successful in some of the largest institutions in the country, because he has a smaller organization and can, therefore, devote more of his personal attention to the many phases of the business than is possible in a large institution. The latter needs a large personnel, naturally, and direct contact between dealer and customer is hardly possible. It may exist in spirit, but the successful carrying out of this must be trusted to those who come into direct contact with the customers.

So, with some of these thoughts in mind let us see what there is in the article of Feb. 15 that we might readily apply to the small town establishment. The fourteen things mentioned at the beginning of this article, taken in the order in which they are discussed in the article, are as follows:

1. Free Half Hour Service—The Detroit Oakland company does, free of charge, any job which requires less than half an hour. This work includes such things as valve adjustment, carburetor adjustment and cleaning plugs. This has had the result of sending the owners away in a friendly spirit with the resolve to come back, later on, when more extensive adjustments or repairs become necessary.

Now, the small town dealer cannot always afford to do a lot of work free of charge, but he must be able to distinguish between the jobs for which he should charge and those done gratis. A new owner, especially, should be watched in this respect, because he is entitled to a good operating and appearing car after he has laid down his money for it. If the general plan of selling maintenance in the small dealer's organization is well carried out, no money will be lost on the rendering of a little free service where it is needed.

The danger point lies in that the small town dealer might carry the thing too far and tell his customers, who probably know him personally, to "just bring the car around any time and I'll put her in shape for you." It is all right to let the customer know that you will take care of him on those things to which he is entitled, but the trouble is in drawing the line between the things to which he is and is not entitled.

Free service rightly handled is an asset, but easily can become quite a leak in the business. There are many things which come under the head of free service, such as inspection of battery and filling cells with water, carburetor adjustment, ignition testing, filling radiator, valve adjustment and filling tires with air. Many of these operations can be performed in a half hour or less, chiefly because the mechanic has no parts to remove or replace. They merely are superficial operations, but often result in a man's car operating much better, for the time being at least.

2. The Flat Rate System—Mention was made in the Detroit-Oakland article that the flat rate played an important role in the success of the establishment. Mention was made that the customer liked to deal with the organization because of the flat rate, and particularly so because the flat rate schedule of prices is exposed to view so a customer can see for himself just what every operation is going to cost. We believe this is something which the small town dealer can use to advantage.

Certainly it is possible for him to get up a list of flat rate

operations that are common to cars and prepare a printed list of these and post them in a conspicuous place in the maintenance department. They can be prepared in pamphlet form and attached to a customer's bill, mailed to him, or advertised in the newspapers of the community. The whole thing resolves itself into letting the customer know.

A man may want bearings taken up, but has an idea that the job will run into considerable money. He is suspicious of these "garage fellows" and consequently makes the old boat do for the time being, when he could save himself money if he had the work done now. But, what to do?

Then, to his great satisfaction, he sees an advertisement of the Runwell dealer in the local paper listing a series of operations which the service or maintenance department is prepared to do on a flat rate basis. He sees that the job of taking up bearings will cost him only \$10.50. Not so much, he thinks. So he drives in the next day and leaves the car for the work and everybody is happy.

3. Holding Old Customers—It's common to have a dealer tell you that he used to have so and so for a steady customer, but he don't seem to show up any more. Then when you go and talk to Mr. so-and-so you often find that he got to the point where he thought the dealer didn't care particularly if he ever came back. So he let's Bill Fixit, or some other mechanic working independently, work on his car. Might just as well

help the small fellow, he thinks; the big ones don't seem to want your business, and there you are.

Now, the Detroit Oakland company is designed not only to keep the Oakland cars in the vicinity in repair, but also to hold the old and gain new customers. Satisfied old customers are as big an asset as any dealer can have. If you can get a car owner to boost your maintenance department and tell his friends how well you take care of him, you gradually build up a prestige such as the best advertising in newspapers cannot gain. If you can get the community to talk well of your place, there is no chance to go wrong on the

future of your business. By all means let the old customers be in such a frame of mind that they will let their friends know that your's is not just another "garage."

Too often we take for granted that Bill Jones, who has been a customer of ours for two or three years, will be a customer the rest of his life. We are too apt to concentrate on the new customer or the prospect, and forget about Bill Jones. Eventually he will feel slighted and before you realize what has happened, the dealer down the street has weaned him away. So, when the Detroit Oakland company says it is making an organized effort to hold the old customers, let's look around and see if we are taking too much for granted and forgetting about old friends. Being friendly and anxious to serve the man who has just bought a car is fine, but it is still better if the spirit to serve well continues year after year.

4. Smoothing the Path of the Customer—"The entire layout has been developed to smooth the path of the customer." This statement was made in the Detroit Oakland story. A book could be written on this phase alone. Most of the book would probably be devoted to a narration of how most places that sell maintenance and repairs make the path rough for the customer.

The larger institutions which handle a big volume of work have given much thought to making it easy for the customer on his trips to the service station. Thus we have service salesmen, contact men, inspectors and others who nail a customer when he drives in and soon take care of his wants. The customer is given a lot of personal attention and he feels as much at home as he does in a large department store.

Fourteen Points That Help to Make Maintenance Pay

1. *Free Half Hour Service.*
2. *The Flat Rate System.*
3. *Holding Old Customers.*
4. *Smoothing the Path of the Customer.*
5. *Get the Customer's Signature.*
6. *A Salesman on the Job.*
7. *Simple Repair Order Form.*
8. *Departmentizing the Shop.*
9. *Keeping Tab on the Work.*
10. *Cleaning Cars After Work.*
11. *Handling Parts.*
12. *Thanking the Customer.*
13. *Keeping the Tools in Shape.*
14. *Lunchroom for the Employees.*

But the small town dealer cannot have as large a personnel as his brother dealer in the large institution and he must, therefore, compromise in some way and do things which at least give the customer the impression that the spirit to serve well exists in this small organization.

Smoothing the path of the customer may mean only a cleaning up of the place, washing the windows, tearing down a lot of old signs that mean nothing, arranging for an automatic door opener, having the customer's bill ready when his car is ready and a number of similar things. We can but suggest them here, because it is up to each dealer's organization to size up the place and see where needed improvements can be carried out effectively.

By all means let someone show attention to the customer when he drives in. Even if you are talking with another customer and John Jones drives in, greet him and let him know you will be with him in just a minute, or something like that. But don't let him come in unnoticed and wait for him to ask somebody if he can have some attention.

We recently went into the service station of one of Chicago's best known dealers and wandered about the place unnoticed for an hour or more. Nobody cared if we were there, nor did they ask if we wanted anything. We asked a customer if this particular organization rendered good service and his reply was, "They do if they know you." That condition certainly can be likened to the colored man leaning against a post and who was asked if he wanted to make a quarter. He answered, "No, boss, I've already got a quarter in ma pocket."

5. Get the Customer's Signature—One of the most lamentable things that can happen is to get a customer's consent to go ahead on a repair job and not get his signature on a flat rate price or maximum estimate agreement.

The other day a shop told a man it would cost about \$500 to put a wrecked car in shape. "All right," said the man, "do the job." The shop went ahead, but found a lot of work, like resetting the rivets in the frame, which piled up the work. They found that on the hourly basis the work amounted to \$650. The owner came for the car with the \$500 in his mind. Zowie! Fortunately there was a good roof on the structure, or he would have gone clear through it. And you can't blame him a bit.

The shop should have had his signature on the \$500 estimate. Also, before doing the additional work the customer should have been called on the telephone. There was no agreement of any kind. It was just a gamble. Nothing was down in black and white and the courts will have to decide the thing. It's going to be a loss for someone and probably the shop will find itself on the small end of the deal.

So, if an owner comes in with a broken frame to be welded, let him know that the body has to come off, probably, and that the job itself cannot be done in a few hours. A flat rate on the job is the thing. Let the customer sign this. Then he knows that \$22 will be the cost and you know that you will get it because there will be no argument about it, or compromise.

6. A Salesman on the Job—Realization of the importance of continued contact with every Oakland owner has caused the Detroit Oakland company to put a salesman in their maintenance department. This salesman is not there to jump on every customer with the idea of telling him he ought to junk the old boat and buy one of the later models. The salesman is there to see that the customer gets the transportation he expects from his car. The salesman expresses to the customer the sales department's interest in seeing that he gets satisfactory service. He also can correct any harmful impressions with diplomacy. The contact with customers often discovers names of people who are good prospects and the salesman is ever on the alert for these.

This idea of a salesman in the "shop" is a good one because it lets the customers know that the sales department is still interested in them. Too often we hear the expression, "They treat you fine until they have sold you a car and then they forget all about you." Meaning, generally, that the persistent efforts of the salesman who sold the car drop off entirely once he has the customer's name on the dotted line. After that, "The service department will take care of you."

The small town dealer is in a better position to follow up the sales of the new car to a new customer, because his volume of business is less and he has more time to give to personal interviews with customers. The service manager, shop foreman, or even the mechanics can play the role of salesman and make a good showing.

We recall a dealer operating in a town of less than a thousand people who, every now and then, when the shop was not too busy, would let "Mike," one of the mechanics, go out with a car and call on some of the farmers on whose cars, trucks and tractors he had worked and who had confidence in him. He would drive one of the new models out on the pretense that he was tuning the engine. A stop for a drink of water at the farm of Len Smith would often result in Len getting enthusiastic about the new car "Mike" was driving and before you could bat an eye Mike would sell a few cars in the territory. So, you see, even the small town dealer can have his salesmen in the service department, just as Detroit Oakland has.

7. Simple Repair Order Form—The important feature of the repair order form used by the Detroit Oakland company is its simplicity, because it provides at one writing a record for the office, invoice and work order.

The trouble in most small shops has been that there has been no definite order or procedure in selling the work. The customer was told, "We'll take care of it. Come in tomorrow for your car." Then on the following day the car would be ready but they had no bill ready. Often the customer was allowed to drive the car away and told he would be sent a bill later on. The shop was too busy just now, etc.

Now, blank forms are available which sell for a nominal sum and especially are they needed if the work is being sold on a flat rate basis. It is far more impressive to the customer and certainly more profitable to the institution if a regular system is adhered to in making out repair order forms and presenting the customer with a bill at the completion of the work. The records are kept intact and the dealer knows at all times where he stands.

8. Departmentizing the Shop—Like most successful maintenance departments, that of the Detroit Oakland company is departmentized. Engines are worked on in one section, axles in another, and the quick service and adjustments are handled in still another place. This makes for efficiency, because it is possible to route the work and no time is wasted in carrying out the work.

In the shop of the small town dealer (and many a large town dealer's shop is the same) we too often find the work being done in a disorderly way. There is no logic with which the cars have been parked in the building. The quick service jobs may be at a point where you have to move half a dozen cars to get them out. We recall a case where a man drove in to have the radiator drained of water and refilled with an alcohol solution. In the midst of the draining process another car came in and stopped directly behind it. On the latter car a rear wheel was taken off and before it could be put on, the car ahead was ready to go out. But the rear car could not be moved and so the owner of the first car stormed around the place because he was stuck there about 15 minutes longer than he wanted to be.

A small town dealer cannot departmentize to the extent of the large maintenance station, but certainly he can have a systematic way of handling the work. Maybe the work bench takes up too much room now. A bench full of tools and parts is no good. It is just that much store space. Better to rip out the bench and put in portable benches. Keep the tools in the tool room or on a special rack, and the parts in the parts stock room.

9. Keeping Tab on the Work—We read in the story of the Detroit Oakland company that a blackboard is kept in the office of the foreman and also in the office of the service manager. Thus they can tell at all times the status of any job and when a man calls on the telephone they can tell him just how the job is coming along and that he can have his car at the stated hour.

Again we must say that a small town dealer cannot go to the elaborate extent of the large town dealer in the way of installing methods and devices which speed up the many

things in connection with the selling of service. We do believe a blackboard or something similar could be rigged up in the small establishment so the stenographer who might get the 'phone call could quickly tell a customer about his car. This is better than to say to the customer, "I can't tell you; I'll have to ask someone in the shop."

Maybe the blackboard is not the answer to the small town dealer's way of keeping record of the work. Perhaps the shop foreman should hand the office a slip at the completion of a job and an office attendant jot this down in a book or proper form so that when a man called he could be given whatever information he wanted. The thing is to have everyone tell the same story.

10. Cleaning Cars After Work—Here we come again to one of the things which can be practiced in every maintenance department, no matter if it is located in a town of 40 or 4,000,000 people. Cleanliness is appreciated everywhere. In the Detroit Oakland company's maintenance department, a car, as soon as the inspector has passed on the work, is turned over to a man who does nothing but clean the steering wheel, running boards, control levers, fenders and any other part of the car which might have become soiled in the progress of the work.

Also, on jobs which amount to \$45 or over, the car is washed and polished free of charge. The company states that this is one of the best things which it does and has resulted in much work being brought into the shop, because the customers realize that their cars are respected and treated as they should be.

It would not cost the small town dealer much to make or have made canvas covers for the fenders and seats, to be used on the car while the work is in progress. It's the easiest thing in the world for a mechanic to touch the steering wheel with grimy hands, but don't let the steering wheel stay that way.

A special man cannot be assigned to cleaning cars only in the average small organization, but it ought to be a part of every mechanic's job, when he gets through with a car, to clean it. At least, the car should be put in the same shape as it was when driven in by the owner. But if you can see your way clear to stretch it a point farther and wash it for the owner, you have everything to gain.

11. Handling Parts—There is a lot of red tape to getting parts in some service stations, and in others there is no system whatever and probably a good many dollars are lost because of it. A cash register is one of the best things the small town dealer can have, because it will save him a lot of worrying.

A cash register is used to advantage in the parts department of the Detroit Oakland company in this way: The parts salesman writes the order for parts on a cash sales register. Two copies of this slip are handed to the customer, who steps to the cashier's window and pays the amount. The receipted bill is handed back to him and the office retains the other. This he again presents at the parts counter, whereupon the parts are handed to him. This relieves the parts salesman from all responsibilities.

12. Thanking the Customer—It is rather rare to get a receipted bill from any organization with the words, "Thank You" written in longhand across it. Maybe the cashier will thank a customer verbally, depending on her disposition, the weather, or anything else. But it is unusual for a customer to get the thank you written in longhand on a bill. The Detroit Oakland company does this.

Is there anything to prevent the dealer in the small town from adopting this idea? Maybe he does not care to adopt it bodily, but it seems to us there is an excellent thought back of it. It is one of those small things which builds no small amount of good will.

proper shape. It is a wrong impression that a good mechanic can do good work even with poor tools. No matter how good a mechanic is, he cannot bore a true hole with a twist drill which has one cutting edge longer than the other.

A machinist is kept busy in the tool room of the Detroit Oakland company looking after the tools and fixtures for the shop. When a mechanic returns a tool, the machinist immediately inspects it and, if necessary, grinds the cutting edge or makes whatever adjustments may be necessary. Then when the next man calls for the tool, he knows that it is in proper condition. Thus no time is lost on the job because of poor tool equipment.

It seems that the small town shop can take a lesson from this and also make sure that the equipment is always in good order. It would be well during dull moments to check up on the equipment. Too often costly precision tools are bunched with a lot of old parts and become injured. It is common to see tools with cutting edges thrown together with hammers or other percussion tools. Carelessness of this kind in the

13. Keeping the Tools in Shape—A good mechanic spends considerable time in seeing to it that the tools he uses are in shop is expensive, to say nothing about the disastrous effect on the morale of the shop.

14. Lunchroom for the Employees—In the very small communities, most of the people working in the dealer's establishment probably go home for their lunch. But in the average small town you will find, especially in the shop, those who carry their lunches. But in most cases the men have not a good place to enjoy their meal. Some of them will vault upon the bench top and eat their lunch there. Others may use the running board of a car, and so on.

Some of the more enterprising dealers in the small towns set aside a small room in their building for the men to use as a lunchroom and rest room. It gives them a chance to relax and they will put forth a lot more effort if they realize that the dealer is "for them."

A study of the fourteen things just mentioned will show that none of them is out of the range of the average small town dealer. He may apply them only in part, but, even so, good results are bound to be had. The best part of it is that not one of them requires an expenditure of money. It's just an application of things which have been done in many other lines of business and which will work out just as well in the automotive business.

Obtaining Car Prospects Through the Service Department

MANY prospects are obtained by the Buffalo Cadillac corporation through its service department, according to H. M. Kinnee, treasurer of the company. The service department keeps in touch with the Cadillac owners in the company's territory, by having its representative call on every owner at least four times a year. When he makes one of these visits, the service man asks the owner about his car, how it is performing, if he has any complaints to make

concerning it, if he has any praises to bestow on it.

If he learns from the conversation that the car is not quite matching up with what the owner expected it to do, he remedies the trouble then and there if it is susceptible of treatment outside the shop; if not he induces the owner to let him take it to the service department and keep it there long enough to put it in shape.

Very often, while the service man is talking to the owner on one of these calls, the owner voluntarily gives him the name of one or more friends of his who, the owner believes, could be induced to buy Cadillac cars. If he forgets to do so, the service man asks him casually if

he happens to know of persons who ought to be driving Cadillacs. Usually he does.

When he returns to the company's plant the service department man reports on his call not only to his immediate chief but to the "front office" as well. If a complaint has been made, the officials of the company personally see to it that it is adjusted to the owner's complete satisfaction.

The company has found that it pays to give free monthly service on new cars, its officials say, for the first year. They assert that buyers like this attention and that many of them, when the year has expired, order it continued at their expense.

Recent Developments in Automotive Industry

Aircore Tire; French Gas Oil Engine; Two New Ruggles Products and Transport Truck Refinements

Aircore Tire

A DOUBLE-cushion type of tire, having displacement spaces located at both external and internal points to accommodate the flow of rubber when under pressure, has been announced by the Kelly-Springfield Tire Co., under the name of Aircore.

The principal cushioning ability of the tire, which permits of deflection under load equal to that of a normally inflated pneumatic tire, lies in the use of a central hollow ring or core surrounding the base band of the tire. This hollow space is in the form of a continuous ring and is of a shape totally different from that usually found in the round-center type of cushion tires. This "spear head" opening, as it may be called, in the Aircore tire, assumes the shape shown in the illustration when the wheel is subjected to sudden load due to impact caused by unevenness of the road surface.

Under these conditions, the side walls of the tire bulge inward slightly, serving to close the opening, while the exterior side walls bulge outward. It will be noted that the rubber displaced in this manner does not cause any severe bend at any portion of the core or side walls. The rubber which is displaced merely follows the easy curves of the core and sidewalls, the form of which is especially designed to produce this effect.



A section of the Aircore tire under no load. Note the shape of the spear-head central opening and the white dotted outline of the traction notches cut in the tread and side walls. The central core opening provides the internal displacement space into which a portion of the rubber may flow when the tire is subjected to load

The further advantage of the spear head shape center is the instantaneous recovery of the rubber to its normal shape after encountering an obstruction in the road. This quick recovery is made possible by the short distance between the outer end of the hollow space and the tread of the tire. If the road shock were to be transmitted from the tread to a small circular opening near the base of the tire, a perceptible lag would be created which would render the action of the tire practically the same as that of a solid at high truck speeds.



External view of the Aircore tire, showing the notches fitted with rubber pebble ejectors

The Aircore tire is intended for front wheel service on all trucks except the heaviest, and for rear wheel service on those trucks which require resiliency, high speed ability and economy of operation. It is made in sizes ranging from 34x4 to 40x8 and 36x10. The prices of the various sizes, while somewhat more than the solid and caterpillar tires made by the Kelly-Springfield company, are considerably less than the same capacities of truck pneumatic tires.

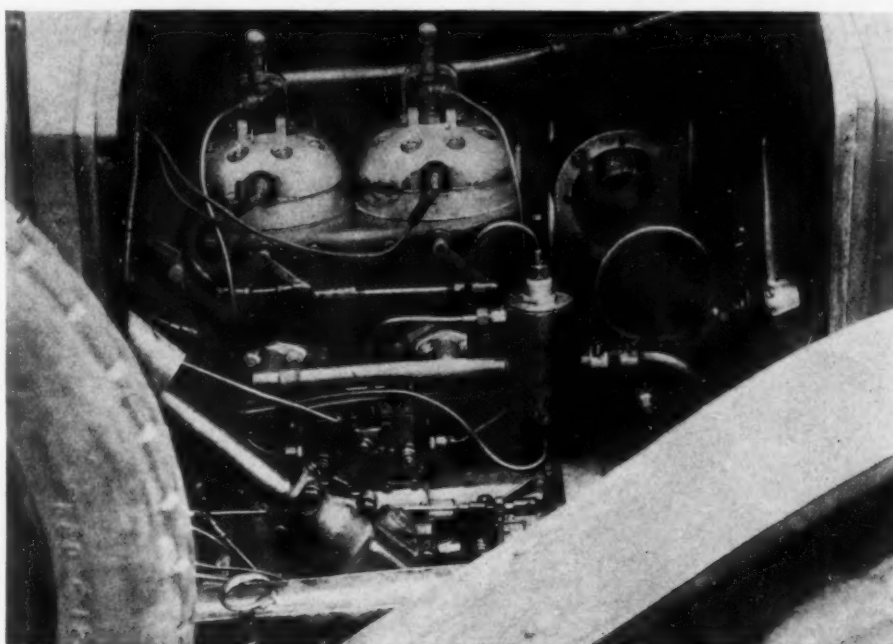
The external spaces of the Aircore tire are in the form of notches cut in the side walls and tread, the latter extending from each side to a point beyond the center. This not only furnishes a displacement space for the rubber of the tread, but also provides good traction in



When subjected to a normal load, the same tire assumes the outline as indicated by the full lines above. The depth of the tread is shortened and the rubber thus displaced is squeezed outward and into the central core. The solid black spaces indicate the position assumed by the rubber thus displaced

all kinds of weather, it is stated. In order to prevent the accumulation of stones or caked mud in these notches or vents, pebble ejectors in the form of a step-like formation of rubber lugs, are provided in each notch.

Gas Oil Engine Shows Economy in French Test



Here is a picture of the two-cylinder, two-cycle 134 cubic inch engine which was used in a Peugeot car recently to demonstrate the use of gas oil. The fuel mileage was 16.6, while a similar car fitted with a four-cylinder, four-cycle engine operating on gasoline, went 15.7 miles on a gallon

Ruggles Brings Out Chanticleer Motor Coach and Go-Getter Light Delivery Truck

Termed popularly as "The Highway Parlor Car" a new motor coach has been brought out by the Ruggles Motor Truck Co., Saginaw, Mich. Excellence of finish is one of the outstanding features of the new coach.

This coach is called the Chanticleer and playing on the name the makers use as a slogan, "Cock o' the Road." The Chanticleer seats sixteen passengers, including the driver, and more may be carried without unreasonable crowding.

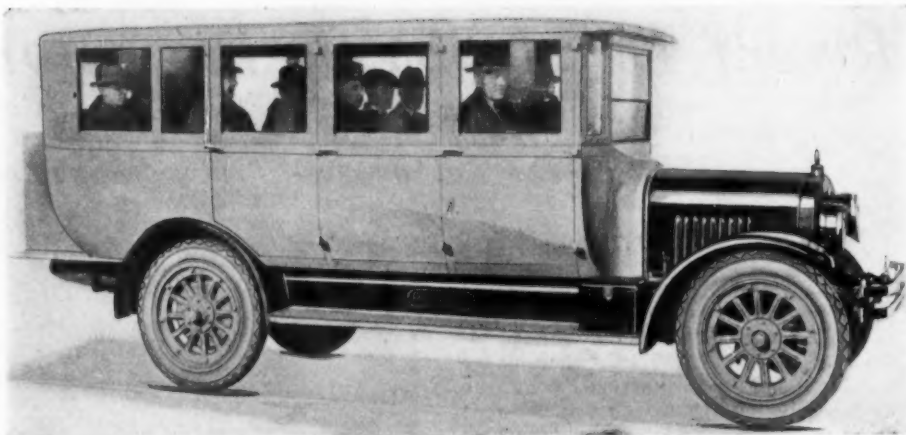
There are three full length seats and two short seats divided by an aisle. All passengers sit facing forward. Access to the coach is secured by three doors for passengers and a special door for the driver.

The seat cushions and backs are upholstered with imitation grey Spanish leather. The exterior above the body line, and the interior, including the roof, are trimmed in the same material as the seats making a nice appearing job.

The Chanticleer is built especially for highway travel. The body is mounted low and special stabilizers are used to insure a high degree of roadability. The body is mounted on the Ruggles 20-AR chassis giving 34 hp.. This chassis has a 138 in. wheelbase, and 178 in. of 10-leaf springs. The frame is channel steel.

While the Chanticleer was manufactured primarily for high class inter-city bus service, it is also finding much demand for transportation service by department stores, hotels, country clubs and similar institutions requiring a conveyance.

A new model called the "Go-Getter" has also been announced by the Ruggles company. It is designed for florists, grocers, bakers, department stores and



The Chanticleer, new Ruggles motor coach designed to carry sixteen passengers and afford them all the comforts of the railroad parlor car. There are three doors on each side

others whose pay load can be handled by a 1,500 lb. capacity truck.

It has a 118-in. wheelbase and the chassis weight is 2400 lbs. It is powered with a 32-hp. engine with $3\frac{1}{2}$ in. bore and 5 in. stroke. A combination force and splash system provides lubrication.

The rear axle is a three-quarter floating type with bevel gear drive. It is enclosed in a one-piece welded steel housing. The construction of this axle is such that the drive shafts may be withdrawn without dismounting the wheels. This makes possible the quick and easy removal of differential and drive gears making a saving of time and expense in case of repairs.

Refinements in 1923 Transport Truck Models

THE following models comprise this year's line of Transport trucks, in which important refinements have been made. Model 15, Rapid Transport, 2,000 pounds capacity; Model 26, 3,000 pounds;

Model 36, 4,000 pounds; Model 55, 6,000 pounds; Model 61, 7,000 pounds; Model 75, 10,000 pounds.

The new type engine has removable head, making it readily accessible. A special manifold construction is said to insure all gas entering the cylinders being dry and provides a correct mixture of fuel and air. Carburetor troubles are also largely done away with.

Full force-feed lubrication affords rapid and complete circulation of oil and carries a large volume of lubricant. The oil works under lower pressure, thus prolonging its life, it is claimed.

Valve tappets are built with hardened tool steel inserts, which take the hammering between tappet and valve stem and hold the valve adjustments.

Gear-cut flywheels and standard S. A. E. mounting for the starter permit the installation of this equipment easily and at small cost. The Rapid Transport is regularly equipped with a starter.

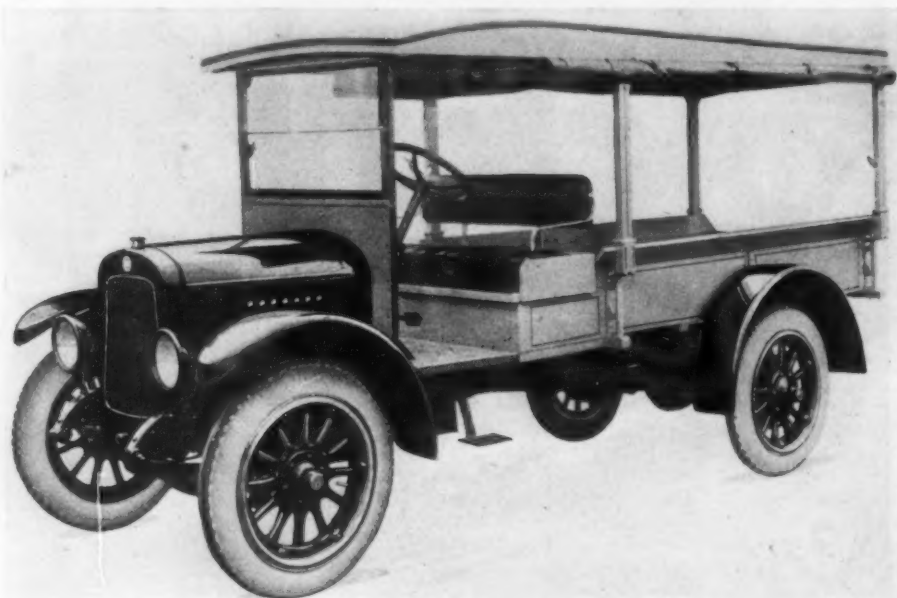
With high torque at low speeds, the new engines meet the growing demand for a wider range of operation—hauling capacity loads at fast or slow speed without the necessity of frequent shifting of gears.

The oil-type, simplified universal joint is now used on Models 36, 55, 61 and 75, while Model 26 now has the same joint, with a two-piece drive shaft, as was used on last year's Model 35, which was rated at 1,000 pounds.

The oil-type joint is lubricated through a single opening—a $\frac{1}{8}$ -in. pipe plug connection, which permits the use of pressure lubricating system. Oil passes through the hollow pins and is fed to all four bearings by centrifugal and capillary actions. This joint requires refilling no oftener than differential and transmission, and uses the same lubricant.

SOUTHERN JOBBERS TO MEET

ATLANTA, Ga., Feb. 26—Dates for the spring and summer meetings of the Southern Automotive Equipment Jobbers' Association, both of which are to be held this year in Atlanta, have been announced by W. Alexander, 81 S. Pryor street, Atlanta, secretary, the spring meeting to be held March 16 and 17 and the summer meeting July 20 and 21.



This is the Ruggles Go-Getter, a light delivery car capable of handling loads up to 1500 lbs. Accessibility is said to be one of its chief features, particularly in the rear axle unit

The Development of a Modern Service-System

PART I

Owners Are Buying Cars More and More on the Realization of Good Service. New Attitude Towards Service Has Caused Many Factories to Adjust Prices of Parts. Piece Work Idea Practical for Large Shop

THIS paper was presented at the Chicago service meeting of the Society of Automotive Engineers and in it the author goes into considerable detail on the causes of poor service conditions in the past. He then shows how good service, intelligently sold is one of the most valuable sales asset the dealer can have and outlines the process of building up a combined flat rate and piece work plan of selling the work.

The author tells at great length the

features of the flat rate system, as practiced in his own organization and shows also that the piece work plan is practical where conditions warrant its adoption. Much clerical work is necessary and unless these facilities are available the piece work plan had better not be used by the dealer.

Records form an all important part and these are kept on special forms that are illustrated. Their method of utilization is given in detail. The duties of the

various members of the service department are set forth and it is shown how the various factors are made to combine and produce a service which has made satisfied customers.

Mr. Hastings is vice-president in charge of service of the firm of Williams & Hastings, Inc., Detroit, Hupmobile distributors for the lower Peninsula of Michigan. He has been associated at various times with the engineering departments of several motor car factories.

By DON T. HASTINGS

THE word "service" has been the most abused word in the automobile language and, unfortunately, it still is in that position in a great many localities. If one mentions "service" to the average motor car owner, he immediately visualizes a gloomy picture in which the high points are overcharges, poor work, discourtesy and delays, with a wonderful background of dirt. This picture has been the natural result of conditions which were allowed to exist for years by practically all motor car dealers. Of course, all of them were not guilty on all the above counts, but some serious criticism was justified of each establishment.

Causes of Poor Service

The unsatisfactory service that has been given in the past can be traced to several causes. Many distributors, who were salesmen primarily, have looked on service as a necessary evil; consequently, they have paid little or no attention to it. It has been left to some mechanic to try to get by in fixing up cars with as little expense to the dealer as possible and no regard whatever for the owner. Another prolific cause of poor service has been ignorance of the product on the part of the dealer, and of its requirements in the way of maintenance. Sheer laziness or inertia has caused these dealers to avoid spending the time and energy required to learn how to take care of cars, and such dealers have no conception of the possibilities of service as a sales asset. Another type of dealer who has helped to bring service into ill-repute is the man whose motto is, "get the money."

The builders of cars themselves have been responsible in a great many cases for the high-price evil, because of the exorbitant figures that they set up as the prices of repair parts. The dealer, of course, could do nothing but accept these figures, although he has followed the builder's example, in many cases, and added a high percentage to the factory price of parts in the guise of a charge for handling, freight, express, and the like. Producers also have been responsible for much of the poor service rendered, because they have not insisted that their distributors and dealers give the proper consideration and study to the service problem.

Good Service as a Sales Asset

Most manufacturers and dealers have failed to realize that first-class service is one of the best aids to the sales department that it is possible to secure. The best advertising is conceded to be the word-of-mouth advertising that a satisfied owner does among his friends and acquaintances. No matter how well satisfied a man is with the car he has purchased, while it is new, he will not remain a booster unless he is able to get satisfactory treatment when in need of adjustments or repairs to his car.

Owners are buying cars more and more on the basis of good

service. The average owner would be satisfied to own any one of four or five cars that are in the same price class, and he is almost certain to inquire about the service given on the various cars before he signs an order. The dealer who has once instituted good service in his establishment is impressed almost daily by the remarks of prospects to the effect that they were rather inclined to buy some competitor's car until some neighbor boosted the dealer's service strongly enough to persuade them to buy one of his cars.

The New Attitude Toward Service

About five years ago, a few of the leading dealers in various parts of the country began to realize that their service departments had not been conducted on the same high plane as had their sales departments. The result was that these few dealers studied the service problem and started to develop this end of their business. Each one, acting independently of the others, consciously or unconsciously adopted the Golden Rule as the goal toward which to strive in their service work. Each one put himself in the place of the individual owner, with the result that they took steps to make their establishments known as having the following service ideals:

- (1) A square deal
- (2) Courtesy
- (3) Cleanliness
- (4) Guaranteed work
- (5) Reasonable prices
- (6) Promptness of delivery
- (7) Promises kept when made
- (8) An adequate stock of parts.

Many of the factories have realized in recent years that unreasonably high parts prices were proving a handicap in the sale of cars. The result is that many of them now have such a price list that the total price of all the parts or assemblies required to form a complete car equals or is less than the price of a complete new car.

Among the steps that have been taken looking toward the accomplishment of the ideals mentioned, perhaps the most important is the establishment of flat-rate or guaranteed charges for labor covering the various operations required in the repair of cars. Some of these flat-rate systems have been developed by individual dealers, and others have been prepared by the factories and transmitted to their dealers. It is much more satisfactory to the owner to be told, before the work is started on his car, exactly what the labor charge will be for the various operations required, than it is for him to come in when the work is completed and find the bill far larger than he had anticipated. If the owner considers that any flat-rate charge is greater than it should be, he has the opportunity of cancelling his order for the particular work in question before it is started. Consequently, this system avoids the unpleasant

4-11

GROUP ENGINE

OPERATION 4-11

SCRAPE CARBON

A Partially drain radiator
NOTE: Preserve anti-freeze solution

B. Remove spark plugs, ignition distributor and disconnect upper hose elbow from cylinder head.

C. Remove cylinder head and gasket.

D. Set each piston in firing position, that is, with both its valves closed, while scraping to prevent carbon getting on valve seats.

E. Scrape carbon from head, tops of pistons, top of cylinder block and from valves.

F. Install new cylinder head gasket and replace head
NOTE: Tighten head stud nuts uniformly one quarter turn at a time, starting with those at center.

G. Clean gasket surfaces on head and water elbow—use new gasket and connect elbow to head.

H. Fill radiator with clean water or replace anti freeze solution.
NOTE: Cylinder head gasket and upper hose connection must be free from water leaks

I. Clean spark plugs and set gap between .022" and .025"

J. Install and connect spark plugs and distributor head

TOOLS REQUIRED

PARTS POSSIBLY NEEDED

REPORT TO FOREMAN ANY ADDITIONAL WORK REQUIRED

Fig. 1—A typical operation sheet giving the various steps that are to be taken

arguments that occur all too frequently under the old method of charges for labor. One of the leaders in this work was Percy E. Chamberlain, whose messages of "Flat-Rate" and "The Lady in White" have been heard by hundreds of service managers in the last few years.

A bit of history now appears necessary to make clear what follows. In 1919, Mr. Williams and I arranged to secure the distributor's franchise for the Hupmobile for the lower Peninsula of Michigan, with headquarters in Detroit. Mr. Williams had had some 15 years of selling experience in the motor car business, and I had been for about 12 years connected with the engineering departments of various motor car companies. The quarters that we were able to secure were such that it was necessary for us to separate the sales and the service departments. The natural result was that Mr. Williams concentrated his attention on the selling end and I fairly lived with the service division. The word "lived" is used advisedly, because for the next three years practically all of my time, not only the days and the evenings, but Sundays and holidays as well, was spent in supervising and developing the service work. The building that we secured early in 1920, when the demand for space was far in excess of the supply, was rather small and extremely dirty; it was very poorly lighted and had been used as a storage garage. The floors were covered from ½ to 1 in. thick with grease and dirt, and the inside of the building was black with soot. As we were starting in with a service policy that covered most of the points listed above, our first big job was to clean house. More than a week was spent in removing the accumulated dirt from the floors alone. The inside of the building was sprayed with white paint, and adequate lights and wall outlets for electric drill and extension light connections were installed. Sectional wooden bins for handling parts were constructed and painted, and a preliminary supply of parts was installed. The bins were labeled with the part numbers, and a perpetual inventory stock record installed. At the end of a month we had a

clean, well lighted shop and parts department, with the skeleton of an organization, and were prepared to give service.

Our next big problem was to develop an organization through which to give owners courteous, prompt and intelligent service. For several months we went through the grief of trying out various men in the several positions. Finally we found suitable men and got them well started along the lines that we considered necessary in the way of educational development. Practically all of the men thus selected are still with our organization, and they have been given the first opportunities to move into more responsible positions as the organization developed. In connection with the educational program for these men, we sent our shop foreman and our leading service salesman to attend a course in shop management at the Young Men's Christian Association school, and paid one-half of the cost of the course.

The Flat-Rate System

Our early analysis of the service problem had convinced us that, ultimately, we would install a flat-rate system of charges for the customer, and that we would also install a piece-work system in the shop. We decided further that our flat-rate charges to the customer should in the great majority of cases cover labor only, as any system that attempted to include the cost of parts, lubricants, and the like, as well as labor, could be only an estimate system, instead of a definite statement of costs. The advantages of this flat-rate and piece-work system were summarized briefly as follows:

Advantages for the Car Owner

- (1) He is advised in advance regarding the cost of the job, so far as the labor is concerned.
- (2) The cost of the work to him is reduced.
- (3) He gets his car sooner, because it reduces the length of time required to do the work.
- (4) It eliminates any misunderstandings as to the charge, because this is arranged in advance.

Advantages for the Dealer

- (5) The cost of performing the work is reduced.
- (6) The tendency is to make the mechanic more careful; for, if his work is judged unsatisfactory by the foreman and the inspector, he must do the work over at his own expense.
- (7) More floor space is created, because the work is performed faster.
- (8) The number of workmen in the shop is lessened.
- (9) More jobs are put through the shop in a given time.
- (10) Disputes over customers' bills are eliminated.
- (11) It eliminates incompetent workmen.
- (12) Loafing is done away with.
- (13) New cars are prepared for delivery in less time, and at a standardized rate.

Advantages for the Mechanic

- (14) His hourly rate while working is increased.
- (15) It increases his total monthly earnings.
- (16) His straight-time work is speeded up, so that he can get back on the contract.
- (17) The mechanic's dislike for certain jobs is eliminated.
- (18) It creates in him an inventive genius, and he designs tools to help him accomplish the work in a shorter time.

We realized that to install such a system on a logical basis required, fundamentally, a knowledge of the various operations required in handling repair work, and also of the average time required for each one of these operations. An analysis was made of the repair operations, and they were divided into 25 groups, each group consisting of a number of operations on a particular unit in the car or covering a certain class of work. The total number of operations listed, including those covering the installation of the more commonly sold accessories, was about 400. As soon as this list was prepared, two lines of work developed; the systematic recording of time and a method of making the operations specific.

The Time-Keeping System

It was necessary that the service salesman write the instructions for each repair job in such a way as to segregate

the operations required in accordance with this new list. It was necessary also that the time-keeping system be arranged so that accurate time was obtained on each operation. The service salesmen were perfectly willing to co-operate, but it took some time to educate them to analyze the customers' requirements in terms of our operation list. A consistent study of the list and of various work orders on my part and by the service salesmen eventually resulted in having the orders written properly. The big stumbling block was to get the time properly reported by the mechanics. Again a process of education and elimination was resorted to, the trouble-makers in the shop left the organization and the records began to come through in fair shape. A time clock was installed to assist in this work, and it seemed to fit the requirements. The outfit has proved to be very satisfactory, since it has an advantage in that electrically controlled time stamps, working from the master clock, can be installed at any point in the building.

As the time-records accumulated, they were posted to individual sheets for the various operations. These summary sheets were checked over by the shop foreman and myself. Any time-records that were obviously too high or too low were rejected, and the average time required on each operation was determined. In the majority of cases, at least 10 valid reports were used in determining the average; in some cases the number was more than 100.

Operation Data

It was decided to write-up the detailed procedure required on each operation, so as to

- (1) Make definite the work required by each operation
- (2) Outline the best procedure to accomplish this work
- (3) Inform all mechanics of any shortcuts developed by anyone in the organization
- (4) Enable a good mechanic not familiar with this particular car to adapt himself quickly to our particular methods
- (5) Avoid the chance of having work ordered by an owner not being completely finished
- (6) Prevent arguments with the mechanics in case their work were incomplete or improperly done, because they must in such case complete it or do it again on their own time.

A standard form was adopted for these operation sheets, the original being written on vellum. Carbon paper was used against the back of the vellum so that clear blueprints measuring 6x9½ in. could be made in any quantity required. The working set of these blueprints for use in the shop was mounted on steel plates, the prints being covered with shellac to preserve them indefinitely. These mounted prints are drawn out on tool checks as required by the workman.

A typical example of these operation sheets is shown in Fig. 1. The group number and name are stated at the top of this sheet, followed by the operation number and the name of the operation. The operation number is also placed in the upper right-hand corner of the sheet. The detail operations, with the necessary notes, are written in as definite terms as possible. It was found to be a difficult task to put these instructions into such form that they could not be misinterpreted even by the mechanic with little education. A space is provided below the instructions for a list of the special tools required and another space for a list of the parts most commonly required. Neither the tools nor the parts are filled in on this sample sheet.

At the bottom of each sheet it is a standard note: "Report to foreman any additional work required." Especial emphasis is laid on this in the shop, as points requiring attention frequently come to the workman's notice, although no mention has been made of them by the owner. Where such additional work is advisable in the judgment of the foreman, an effort is made to get in touch with the owner by telephone, to secure his authorization for the extra work. If it is impossible to reach the owner, the general rule is not to do the additional work; although in some particular cases, where the owner is well known to the service organization, the additional work is done if it is of relatively small amount.

Repair-Job Order Form

After a process of development had been gone through, the repair-job order form shown in Figs. 2 to 5 was finally adopted. This form is printed in quadruplicate. The first sheet, Fig. 2, is the owner's copy; the second, Fig. 3, the office copy; the third, Fig. 4, the foreman's copy, and the fourth, Fig. 5, the shop copy that is used by the mechanic.

To carry the fourth copy on the car, a celluloid-faced cloth

RECEIVED BY SHOP 9 A M 11-15-22	PHONE NO. MB1N 100	CAR Hupp	MODEL R	CAR NO. 86000	DATE 11-15-22	REPAIR JOB NO. 19652	INDICATE DISTRIBUTION BY P-OWNER PAYS H-HOUSE CHARGE	BILLED BY	COST TO OWNER
OWNER'S NAME John Doe		ADDRESS 3000 Clay Avenue		CITY	MILEAGE 8000		CHARGE FOR	DATE	Parts Met 63 Accessories Sales Order 17 50 Gas, Oil Grease (Attached) 1 00 Wash Polish Remedy Outside Call Driver Contract Labor 8 00 Hourly Labor Misc. Misc. Misc. TOTAL 24 13
WORK ORDER—USE A SEPARATE LINE FOR EACH ITEM							LABOR	MATERIAL	CONTRACT LABOR CHARGE
1	Grind valves and clean carbon					4-12	P	P	8 00
2	Change Motor oil					4-1	H	P	
3	Install front C. G. bumper (Black \$17.50)					25-50	R	P	
4	Report to owner on general condition of car					S T	H	H	
Promises made as to the completion of work are dependent on conditions beyond our control. If a car is not removed within 24 hours after notification that work is completed it will be placed in storage at owner's expense. It is expressly agreed that Williams & Hastings, Inc., shall not be responsible for loss by fire, or for loss or damage to cars, parts, articles of equipment or loose articles, furnishings or accessories by theft, accident or otherwise, unless a specific agreement to that end is made in writing, nor for detention or delay in delivery of cars, nor for consequent damages or loss of use of said car, however caused. The receipt of the car at any time by the owner or his representative shall constitute a waiver of all claims or loss or damage thereto. Cars are examined, tested and driven by our men solely at owner's risk.									
I AUTHORIZE THE ABOVE WORK ON MY CAR FOR WHICH I AGREE TO PAY CASH ON DELIVERY OF CAR. I ALSO ACCEPT GENERAL CONDITIONS PRINTED HEREON.									
John Doe OWNER PLEASE SIGN HERE					Thursday 5:30 AGENT SIGN HERE CAR PROMISED ORDER TAKEN BY				
WILLIAMS & HASTINGS, Inc.—OWNER'S COPY									

Fig. 2—The original or owner's copy of the repair-job order form

RECEIVED IN SHOP 9 A. M. 11-15-22	PHONE NO. Main 100	CAR Hupp	MODEL R	CAR NO. 86000	DATE 11-15-22	REPAIR JOB NO. 19652	INDICATE DISTRIBUTION BY P-OWNER PAYS H-HOUSE CHARGE CHARGE FOR	BILLED BY DATE	Distribution Parts Met Accessories Sales Order Gas, Oil, Grease, Alcohol Wash, Polish, Simola Outside Call Driver Contract Labor Hourly Labor Miscell. Miscell. Miscell. Miscell. TOTAL	Owner 63 17 50 1 00 8 00 13	HOUSE	COST	
OWNER'S NAME John Doe		ADDRESS 3000 Clay Avenue		City									
WORK ORDER—USE A SEPARATE LINE FOR EACH ITEM													
1	Grind valves and clean carbon					4-12	P	P	8 00				
2	Change Motor oil					4-1	H	P					
3	Install front C. G. bumper (Black \$17.50)					25-50	H	P					
4	Report to owner on general condition of car					S T	H	H					
5													
6													
7													
8													
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													
I AUTHORIZE THE ABOVE WORK ON MY CAR FOR WHICH I AGREE TO PAY CASH ON DELIVERY OF CAR. I ALSO ACCEPT GENERAL CONDITIONS PRINTED HEREON													
John Doe					Thursday 5:30		CLAIM ON FACTORY NO.		APPROVED BY				
OWNER PLEASE SIGN HERE					AGENT SIGN HERE		CAR PROMISED		ORDERS TAKEN BY				
WILLIAMS & HASTINGS, Inc.—OFFICE COPY													

Fig. 3—The front of the office copy

envelope, open at the top, is provided. This protects the shop copy from grease and dirt while the work is in process. A detailed description of this repair-job order form will not be attempted here, as the reasons for most of the notations are obvious. It probably will suffice to call attention to the claim check at the right-hand side of the owner's copy. This sheet is perforated so that the claim check can be detached readily. In the space on the office copy, Fig. 3, corresponding to the claim check on the owner's copy, are two columns for house charges and the cost of various items. These two columns carry data that are of no interest to the owner. The back of the office copy, also carries two columns at the left-hand edge which correspond to the claim check section of the owner's copy. These two columns provide for the entering of the date and the operation number; consequently, they do not appear on the owner's copy. The time column is not filled in where an operation is specified, as the charge for any operation is a fixed amount. The time column is used only where straight-time work is done.

The repair-job orders are written up in pencil, carbon paper being used between the sheets. Typewritten orders

look neater, but to typewrite them would require the services of at least one more clerk and seriously delay getting work started and also the completion of the billing on those jobs that are finished at the end of the working day. It will be noted that the foreman's copy and the shop copy of the repair-job order form are smaller than the other two copies. This is to avoid putting into the hands of the men in the shop information in regard to prices that is of interest only to the owner.

The repair-job order forms are padded in lots of 25 sheets, and each of the service salesmen is provided with a light wooden tray into which one of these pads fits. A piece of sheet aluminum about 1/16 in. thick and the same size as the pad goes with each one of these trays. It is inserted under the fourth copy of the top repair-job order form, to afford a satisfactory even surface for writing. If this were not provided, it would be difficult to write toward the right-hand end of the pad, because the pad tapers in thickness, due to the smaller size of the foreman and the shop copies.

RECEIVED IN SHOP 9 A. M. 11-15-22	PHONE NO. Main 100	CAR Hupp	MODEL R	CAR NO. 86000	DATE 11-15-22	REPAIR JOB NO. 19652	INDICATE DISTRIBUTION BY P-OWNER PAYS H-HOUSE CHARGE CHARGE FOR	BILLED BY DATE	Distribution Parts Met Accessories Sales Order Gas, Oil, Grease, Alcohol Wash, Polish, Simola Outside Call Driver Contract Labor Hourly Labor Miscell. Miscell. Miscell. Miscell. TOTAL	Owner 63 17 50 1 00 8 00 13	HOUSE	COST	
OWNER'S NAME John Doe		ADDRESS 3000 Clay Avenue		City									
WORK ORDER—USE A SEPARATE LINE FOR EACH ITEM													
1	Grind valves and clean carbon					4-12	P	P	8 00				
2	Change Motor oil					4-1	H	P					
3	Install front C. G. bumper (Black \$17.50)					25-50	H	P					
4	Report to owner on general condition of car					S T	H	H					
5													
6													
7													
8													
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													
I AUTHORIZE THE ABOVE WORK ON MY CAR FOR WHICH I AGREE TO PAY CASH ON DELIVERY OF CAR. I ALSO ACCEPT GENERAL CONDITIONS PRINTED HEREON													
John Doe					Thursday 5:30		CLAIM ON FACTORY NO.		APPROVED BY				
OWNER PLEASE SIGN HERE					AGENT SIGN HERE		CAR PROMISED		ORDERS TAKEN BY				
WILLIAMS & HASTINGS, Inc.—FOREMAN'S COPY													

Fig. 4—The foreman's copy

RECEIVED IN SHOP 9 A. M. 11-15-22	PHONE NO. Main 100	CAR Hupp	MODEL R	CAR NO. 86000	DATE 11-15-22	REPAIR JOB NO. 19652	INDICATE DISTRIBUTION BY P-OWNER PAYS H-HOUSE CHARGE CHARGE FOR	BILLED BY DATE	Distribution Parts Met Accessories Sales Order Gas, Oil, Grease, Alcohol Wash, Polish, Simola Outside Call Driver Contract Labor Hourly Labor Miscell. Miscell. Miscell. Miscell. TOTAL	Owner 63 17 50 1 00 8 00 13	HOUSE	COST	
OWNER'S NAME John Doe		ADDRESS 3000 Clay Avenue		City									
WORK ORDER—USE A SEPARATE LINE FOR EACH ITEM													
1	Grind valves and clean carbon					4-12	P	P	8 00				
2	Change Motor oil					4-1	H	P					
3	Install front C. G. bumper (Black \$17.50)					25-50	H	P					
4	Report to owner on general condition of car					S T	H	H					
5													
6													
7													
8													
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													
I AUTHORIZE THE ABOVE WORK ON MY CAR FOR WHICH I AGREE TO PAY CASH ON DELIVERY OF CAR. I ALSO ACCEPT GENERAL CONDITIONS PRINTED HEREON													
John Doe					Thursday 5:30		CLAIM ON FACTORY NO.		APPROVED BY				
OWNER PLEASE SIGN HERE					AGENT SIGN HERE		CAR PROMISED		ORDERS TAKEN BY				
WILLIAMS & HASTINGS, Inc.—SHOP COPY													

Fig. 5—The shop copy of the repair-job order form that accompanies the car on its progress through the shop

A Sales Department With a Definite Program

Chicago Distributor of Wills Sainte Claire Outlines Comprehensive Plan for the 1923 Campaign

DAYTON KEITH, Chicago distributor, has brought a lot of experience to bear on his 1923 New Year Resolution. This resolution is a plan for a definite sales effort and the government of his sales department. This resolution was put into definite form at the beginning of the year but has just been made public through The Gray Goose, The Wills Sainte Clair dealer publication.

While sufficient time has not been given for a thorough test of this plan, Keith is gaining confidence daily in the success of his plan. Members of the sales force have accepted the plan because they see in it an effort to impartially help each member of the force to make more money by selling more cars. The statement of the plan is here presented as prepared by Keith:

By DAYTON KEITH

1. We are laying out a plan of six sales meetings to be held on alternating Monday nights through January, February and March. At these meetings will be studied the rudiments of selling, advertising, efficient organization and metallurgy. In some cases outside speakers will be secured to discuss certain phases of the business.

2. At 8:30 each morning a sales meeting will be held, conducted by the sales manager, at which time the previous day's activities will be discussed by the sales manager with the men, and plans and demonstrations for the current day prepared.

3. (a) Each salesman will turn in a blue report on all old prospects canvassed.

(b) A red report on all new prospects secured.

(c) A brown report on all interviews with owners.

4. Salesmen to be required to call on at least two owners per day under normal circumstances and where the owner is dissatisfied a duplicate of the report will be turned in which will be followed up by the superintendent; where difficulty is found the salesman to tag his report ahead for two weeks and follow up at that time to ascertain whether or not the Service Department has done its duty. Owners are to be called upon at least once each month after the first month—once a week by telephone during the first month of ownership.

An owner's record or chart will be maintained by the sales manager for the entire year, on which will be marked the dates he has been called upon by salesmen. Calls must be made in person so that the Wills Sainte Claire salesman's personality can be impressed upon the owner to the exclusion of any foreign car salesmen. Where an owner has been sold by an ex-salesman his name will be placed in the hands of a salesman now on the job and considered the latter's owner for the purpose of follow-up, re-sale and as a new prospect factor.

5. A daily calendar will be maintained on the new car floor on which will be reported by the floor salesman all callers during that day, from which we will be able to check the pulling power of our advertising.

6. The same will be maintained in the used car department in order that we may ascertain how many calls per

day are received per \$100 invested in advertising.

7. A definite schedule will be laid out by the week to cover the time the sales manager is to spend with each salesman in the field work. Until the sales force becomes too large, a half day a week will be spent by the sales manager with each salesman to insure that the latter is working intelligently and effectively. We believe that half a day spent in the field by the sales manager will tell him more about the salesman's ability to make good than a half year spent in casually looking him over at the morning meeting.

8. A floor schedule for each salesman will be drawn up a month in advance, two salesmen on the floor daily, rotating in an impartial manner.

9. In addition to his report for the previous day, which will be turned in to the sales manager at each morning meeting at 8:30, the salesman will make up in duplicate a chart for his current day's work, indicating that he has a definite program to work against. A duplicate goes to the sales manager. This accomplishes two things. It encourages systematic work by the salesman (which is so essential to his permanent success) and it gives the sales manager an opportunity to know where to reach the salesman in an emergency during the day.

10. Salesmen will be assigned the use of a Wills Sainte Claire for one full day each week to make such outlying calls as he may plan. Salesman therefore can lay out his work to be in the congested districts on certain days and the outskirts when he has the use of a car. One driver and demonstrating car and two extra cars will be used to start the plan in operation, which number will be augmented if the occasion demands.

11. The sales manager to help in planning the salesman's day until the latter is sufficiently trained to avoid haphazard work.

12. Map of Cook County will be pegged with all owners in Cook County at their residence address, using a large black tack for any owner who has more than one Wills Sainte Claire. On this map will be special cards showing various outlying towns which will be pegged with the number of cars which have been placed therein.

13. A blackboard bulletin in the sales-

meeting room will be maintained, on which will be posted in properly constituted columns the following information:

- (a) Salesman's name.
- (b) Salesman's estimate.
- (c) Number of cars he will sell during month.
- (d) Sales made.
- (e) Deliveries made.
- (f) Used cars sold and delivered.

These postings will be made a part of the morning meeting and will take five minutes of interesting work. The blackboard will also show the following information in proper squares:

- (g) Daily calls on old prospects made by salesman.
- (h) New prospects secured.
- (i) Demonstrations made.
- (j) Interviews with owners.

This information is recapitulated daily and indicates just exactly how much work has been accomplished on the previous day, at 8:30 in the morning.

A column is reserved on the bulletin board showing the losses or gains which each salesman makes on used car deals. This prevents partiality being shown to any one or two individual salesmen in assisting them to put over deals where the trade-in value of used cars might be exalted. It also keeps the salesmen interested in "buying" the used car at the best possible price in order to keep his public record clean.

14. Every new owner, as soon as his car has been delivered, will receive a letter from the Superintendent outlining the best way to keep his Wills Sainte Claire car working at the highest point of efficiency. When an order is closed the buyer will receive a letter of thanks from the president.

When a new prospect is obtained he will receive a letter thanking him for his interest, from the sales manager, together with the latest circular we may have developed, outlining the good points of the car.

15. Each salesman is requested to maintain an individual card record of his own, by means of which he can be in business for himself, handling his own follow-ups and records instead of depending exclusively on the clerical efficiency of a company clerk.

A patented file called the "MEM" index has been recommended and is being used by a number of the salesmen.

The Square Deal in the Electrical Shop

"Ask 'Em to Buy" Makes Good In a Small Town

TO the Editor of MOTOR AGE:

Do you remember way back when; perhaps it was because your mother made you, or you did it to please your wife; at any rate they got you into a church and much to your surprise you stayed awake most of the time and heard a good part of the sermon. And perhaps you got all pepped up inside, and resolved to turn over a new leaf. Then when you got outside, you kind of missed the connection or something, and the story of the good Samaritan or whatever it might be didn't seem to apply so well.

I thought it would be that way with the selling and shop stunts that we have been seeing pulled off in the merchandising films, "Ask 'Em to Buy" and "Shop Profits," but I found I was all wrong. The stunts are good, and what's more they work. I've seen 'em work, so I know it can be done.

"It's a few weeks now since I went to see the films with my old friend, Bert Rockabrand. A year ago I knew him when he was studying the electrical end of the business, and when I ran into him at the meeting in Chicago I was surprised to hear that he was running his own place and making a go of it. I told him then that I was going to run out to St. Charles and see his joint, and that visit to Bert's shop is what I want to tell you about.

"Well, it was about this way," said Bert in answer to my first question. "I didn't have a cent. Used to be a cook on trains running through to the coast, but that's no job for a married man, so I quit that and went out and got a job. The job happened to be in a machine shop. That was all right as far as it went, but the trouble was it didn't go far enough,



And this is Bert

at least in the matter of compensation, while in another way it went too far, so far as to nip off one thumb, and that sort of took the pep out of me as far as straight mechanical things are concerned.

"I had always had an idea that there would be a good chance in our town for a fellow that really knew the electrical game, and could do a job right, instead of butchering it. So when I got some money as a result of the accident, I decided then and there I would take a course, specializing on the battery and electrical details of motor car construction.

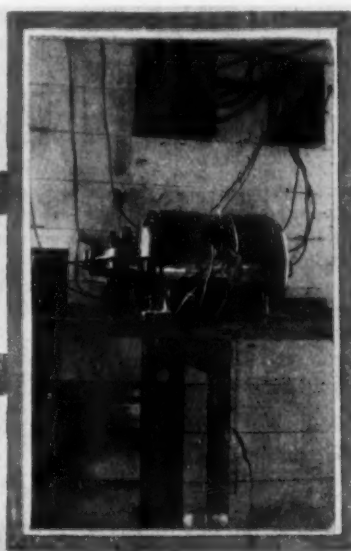
"As I said before, I didn't have a cent of my own but managed to borrow a thousand dollars to use in starting up. That isn't a lot of money when you consider I had a wife and kid to support, but we scraped along, and every nickel we could squeeze out we put back into the business. That's why I can do the work right and make money at it. It's the equipment that counts, and I don't

intend to stop buying as long as I lack anything that I really need to do the work better and faster.

"When I started I had a hundred separators, now I carry a stock of a thousand or more, and have capacity for about three thousand in that big lead lined box you see over there. I had all of five rental batteries to start; now I have thirty-five. I sell a whole lot of lamp bulbs, started with about a hundred, sell them all the time, but don't let the stock get low, never can tell when you will offend a good customer when he needs a bulb badly, and you don't have the right kind. That's why I keep the stock up at about a hundred and fifty now. Didn't have any switches or brushes, now I have an



Batteries on charge



This outfit took a large slice of the original investment



Battery parts and supplies

assortment of switches and keep about fifty dollars' worth of brushes so I can take care of nearly any job as far as supplying brushes is concerned.

I had first figured on some more questions I was going to ask Bert when a big fellow came in and asked about his generator. Bert had it all apart and showed him the result of the autopsy.

"Needs new bearings and brushes anyway," he said. "The pull of the fan belt for four years has gradually put the bearings out of commission. That let the armature rub on the pole pieces so that you may need a new one. See how the solder is all thrown out here?" And Bert pointed to the commutator where the armature wires were nearly ready to let go.

"Now I'll test it for you and see if it can be saved, glad to save you some money if possible, but it may be cheaper to have a new one now while the machine is apart."

It was at this point that Bert struck a snag, for when an attempt was made to get the armature out of the machine, the shaft stuck in one bearing and seemed to defy all efforts to move it. A gear puller was tried, but the frame of the machine was of peculiar shape, and afforded no place for the claws of the tool to get a hold. Then a hammer and drift were used, but the weight of the armature was such that these efforts were also ineffectual.

"Here's where I get an arbor press," said Bert, "first chance I get. If I spend an hour or so on some fool jobs like this, it won't take many of them to pay for it." Finally by filing away the corners of the shaft on the theory that a minute burr was interfering, the shaft was persuaded to come out with the hammer and drift argument.

Then another point was scored with a good piece of equipment. Bert pulled out his growler with which he tested armatures and before the customer's eyes made a very thorough and complete test. When he had finished he said, "Well, she tests O. K. but the cotton covering on the wires is badly scorched and there is no telling whether the job will last three years or three days after I get through with it. If you let me have the armature rewound or if I can put in a new one I can guarantee the job; of course, if you want to take a chance, I can put the old armature back in. The customer demurred over the additional cost, so Bert said, "All right, we will fix up the job with brushes and bearings, the best way we can, and hope she stays put."

After the customer had gone, I said to Bert: "How do you get by and make any money on a job of that kind? You fooled away an hour or two talking to that fellow and monkeying around without really accomplishing much. Do you charge by the hour or how?"

"Well," said Bert, "that job will cost that man sixty-four for the labor and then whatever more the parts come to. I just size up the job and figure it is worth so much."

"Then what do you do in case he wants to hang around until the job is all done so that he knows how much time you put in and can figure how much you are getting an hour?"

"In that case I always find some reason why I can't finish the job then. Always make it run into the second day. That doesn't mean I am trying to beat them, but they don't understand what real electrical service and all this equipment is worth, so to keep people satisfied they must be made to feel they are getting their money's worth."

"Then by making all the tests before them and having all the cards on the table, also by standing back of my work



Room here for five or six cars

Rear of the Shop

good will of your customers is the best there is.

"In fact I figure that treating my customers honestly and fairly is the reason I am doing so well, and accounts for my getting business not only from other shops but also from neighboring towns.

"When I first started," Bert continued, "a man drove in and said that some garage man had told him that he needed a new battery. All the garage fellow had done was to look at the battery and say a new one was needed. The car owner was not such an easy mark as the garage man had figured and came to me to ask how it was possible from the outside to tell about the inside.

"I told him that I didn't know either how such a thing was possible, but that if he would let me open her up we would soon both see what the condition of the plates and separators might be and whether the battery could be repaired or whether a new one really was the answer. So that's what we did. The battery needed nothing more than reinsulating. I saved him a large part of the cost of a new battery. That is about eight months ago and the battery is still working fine. Now that man is one of my best advertisements and I really do not know just how much work has come to me from his recommendation alone.

"Nor does that mean, however, that I do not ask them to buy when I get a chance, for I sell quite a number of new batteries; but if parts only are needed, then I just sell the parts. But whatever I say is needed, you can bet on it the need really exists."

Just then the door opened and a couple of burly farmers came in to ask if they could get a battery charged. "Sure," said Bert, "bring her in." The battery was out of a Ford sedan and Bert immediately noticed that the box was acid soaked. At first he figured that the battery had been allowed to freeze, and questioned the farmers accordingly.

It developed, however, that this was not the case, but that the hold down bolts had been left off and the battery had bounced around so that acid was always slopping over the top. Then Bert proceeded to sell them a new box so that by the time they left the dollar charging job had changed to a four-dollar battery job.

Flat rates and decision in rendering them seemed to me one of the factors in Bert's success. Quick as a flash he would answer the question as to the price of a job. Lumping labor and material, he would quote six dollars, four-fifty, one dollar, or whatever the amount happened to be, and with the quotation one gained the impression that the price was as just and definite as the price of postage stamps.

Then a farmer's lad came in and wanted to buy a terminal for the starter cable on a Ford. "How you going to put it on," said Bert.



Front of the shop

"A feller up at the——garage is going to do it for me. He's fixing up the speedometer."

"Better drive your car in and let me do it. That's my business and you can depend on it it will be done right. It will cost you a dollar for taking the cable off, putting the new terminal on, labor, material and everything, and you know it will be done right."

"All right," said the boy. "I'll go get the car and the dollar."

And he did, and Bert did.

"Now," said Bert, after the boy had gone, "there are two of those 'Ask 'Em to Buy' stunts that I use all the time. One is to follow up the price by some good selling argument. When I told those farmers they needed a new battery box and that the cost in all would be four dollars, I added that it might save them ruining their battery, and that the cost of a new battery was many times four dollars."

"Then when I get a car in here and find it really needs some new piece of equipment, I do my best to not only sell it but get the job of putting it on. See those dash lights over there? I didn't have those a year ago. Now when a man says his generator went bad at night but he didn't know it because he couldn't see the ammeter, you bet I sell him one of those. 'Three-fifty, installed, lamp, labor, wire and everything, AND it may save you many times that amount in warning you of trouble before it has gone so far that you need an expensive armature.'"

Now, Mr. MOTOR AGE Editor, you may be interested in some vest pocket pictures that I took of Bert's place. It may not look like much of a place, but it's pretty good inside. It isn't one of those thirty-thousand-dollar buildings, the kind that make the best pictures, but it's a real place, and if Bert keeps on the way he is going he will have a better place before long.

Says he isn't going to wait for a new building, though, before he starts slicking up a bit. That old farm wagon in front of the place sure doesn't make it look like an up-to-date electrical shop, and Bert is going to get it parked somewhere else. The oil sign on the front of the building is doomed to come down. The oil is all right, and the sign may have been all right a year ago when the Ford station was in the same building, but it certainly doesn't belong on the front of an electric and battery service station. What does belong there is one big sign that tells a block away what is happening inside the building.

Then there is another improvement Bert is going to make. He has a couple of windows in the front of the place. They are loafers and don't work for him. Just spend their leisure time catching cobwebs and flies. It won't cost much to rip them out and put in one big window, with a little show space behind it where he can put in some electrical parts and accessories, so that the window space can begin to pay dividends. So you see Bert's on the right track and going stronger every day. More power to him.

23 Years Ago This Week In Motor Age

An Indianapolis Enterprise

A new automobile enterprise, managed by persons long connected with the bicycle trade, has just been launched. It is known as the National Automobile & Electric Co., and has been incorporated under the laws of Indiana, with a capital of \$250,000, of which \$150,000 is in common stock and the balance in preferred. According to the charter the object of the organization is to make, buy and deal in self-propelled vehicles of all kinds.

At the head of the enterprise is L. S. Dow. Associated with him are A. E. Metzger, Arthur C. Newby, Phillip Goetz, Charles E. Test, Robert Martindale, Harry T. Hearsey and a number of eastern capitalists.

Elmore Vehicles Were Made

An Ohio paper says that the first automobile manufactured by the Elmore Mfg. Co. has been in operation on the streets for the past few days and has attracted a great deal of attention and much favorable comment. It is a light and handsome vehicle and is driven by gasoline.

Tried It at Marion, O., Too

Marion, O., according to a local paper, is to have another manufacturing concern, the Stringer Automobile Co. The company will be incorporated with a capital stock of \$20,000, the greater part of which has already been subscribed. When the company first begins the manufacture of automobiles the motors will be purchased from motor companies and the carriages and other machinery will be manufactured by the company in Marion. After the company is in good running order it expects to manufacture the entire equipment of the carriage.

Sad Fate of a Driver

An automobile driver in full uniform strolled into the cabmen's ball, at Cen-

tral Hall, 22nd street and Wabash avenue, Chicago, recently. Unconscious of danger, he walked boldly out into the center of the floor. The cab drivers were too astonished by this audacity to act for fully a minute. For a short time the automobile driver looked scornfully at the hackmen. Then the cabmen awoke to action. Half a dozen of them seized the intruder and rushed him to the door. The door closed on the evicting party and the dancers inside will never know exactly what fate overtook the motor vehicle man. When the noise of breaking glass and a series of heavy thumps on the stairway ceased, the volunteers

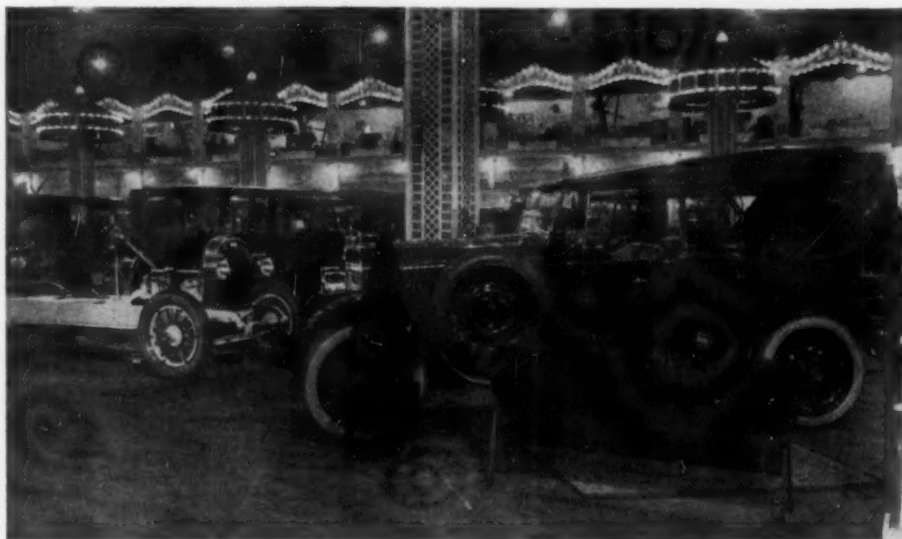
returned. They failed to explain what had become of the "automobily" swell, but their faces were eloquent with satisfaction.

The Progress of a Year

Twelve months ago the park commissioners of Chicago were engaged in a struggle to prevent the operation of automobiles on the boulevards and in the parks. Last week they issued instructions to the president to investigate the practicability of automobiles for the superintendent and captain of park police. It was the opinion of the majority of the commissioners that they could be operated cheaply and successfully. Thus does the inevitable result of progress assert itself.

A Corner of the Louisville Show

(Story on page 33)



Louisville dealers have joined the ranks of the automobile men who staged successful shows this year

What Is This Used Car Problem?



MAXWELL MOTOR VEHICLES

EMMONS MOTOR SALES9 SPRING STREET
ASHTABULA, OHIO

February 23, 1923.

Motor Age.,
Maller's Bldg.,
Chicago, Ill.,

Gentlemen: Attention Editorial Dept.

I have been a subscriber of your magazine for several years and on the strength of that I claim the right to run off at the head a little.

I have read so many editorials, opinions, speeches and solutions of the "used car evil" that I want to know what it is all about. We welcome the used car as a profitable part of our business. We prefer to deal with the man who has a used car to turn in. We depend on the used car to absorb the overhead on the new car and leave the new car profit for velvet. Also our used cars enable us to keep enough men in the shop so that the overhead per man is not excessive.

In the first place we appraise the used car for what it is worth "as is" wholesale not retail. We rebuild it and sell it for what it is worth guaranteed retail. If our prospect will not accept our price for his old car we hand him one of our second best cigars, wish him well and send him on his way. Sometimes he comes back. We have never yet been forced by any unscrupulous prospect to take his old car if we didn't want it. We also refuse to place cars on sale that belong in a museum. In other words we are not "Santa Claus" for any one but our own kids.

We not only sell our own used cars we buy them from individuals and other dealers and are darned glad to get them. We got just as hard up during the depression as any one else but we placed the blame where it belonged not on the used car. We got hard up because I was no Ouija Board. I guessed wrong. I did not anticipate the hard times. I was overstocked with high priced merchandise that wouldn't move. But with the help of all the banks in town and a few of our friends we took our loss and swore "never again".

We unloaded our cars at any price we could get and went out to make up our losses and we are doing it. All we need now is a little time and we will have money enough to go crazy again. If you have read this far I thank you.

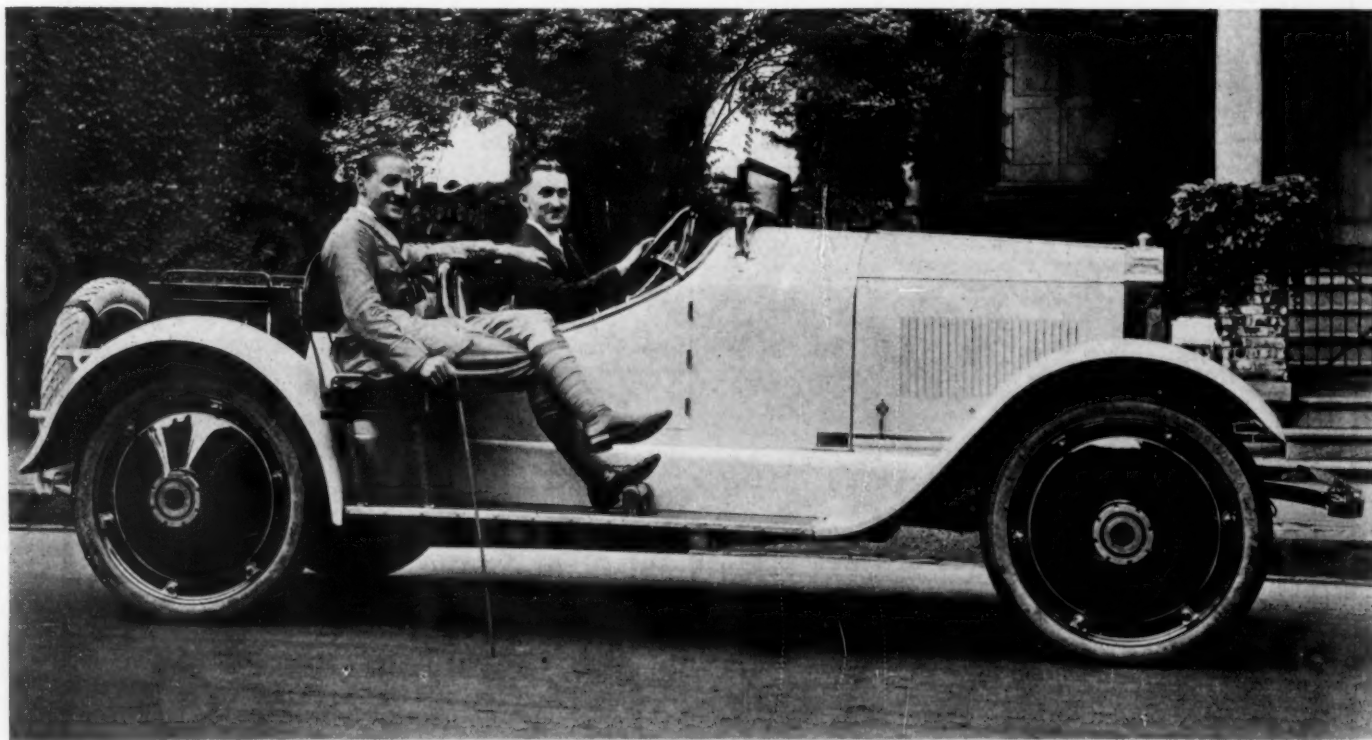
Very truly yours,

EMMONS MOTOR SALES.

CHE:H

We nominate for the Automotive Dealer Hall of Fame, Charles H. Emmons, as the author of this letter

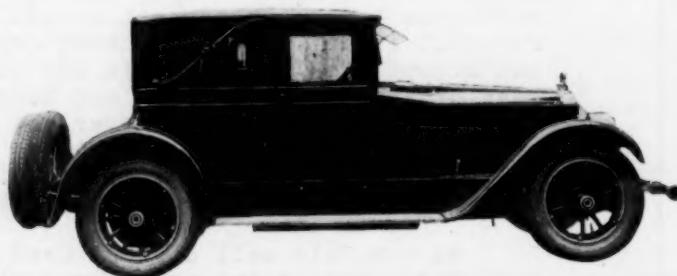
MOTOR AGE'S PICTURE PAGES



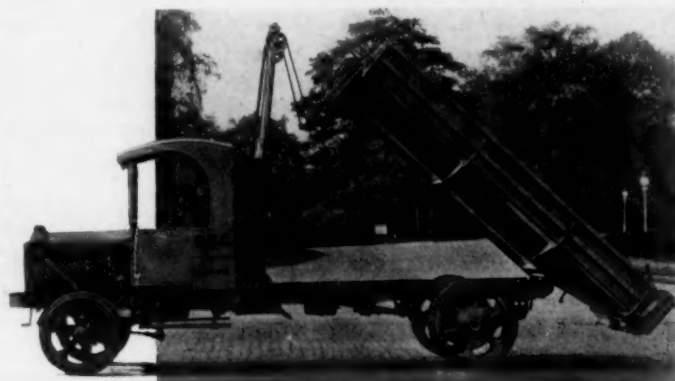
You probably never would guess the make of this car. It is an Oldsmobile Eight chassis which has been revamped by the Schuette company of Lancaster, Pa., and has mounted on it one of the company's special roadster bodies finished in ivory, black and nickel. Charles Schuette, the designer is at the wheel



Even an automobile might cry for an 8-hour day if it had to carry this man around very much. Yet he has driven the same car for 5 years, averaging about 50 miles per day.



Another Schuette creation, a close coupled four-passenger cabriolet on a Packard Twin Six. It is finished in lake, vermillion striping and black leather top



One hundred and twenty-eight of these trucks are to be delivered to the city of New York by the White company. They will be used for all phases of street cleaning work

OF AUTOMOTIVE INTEREST



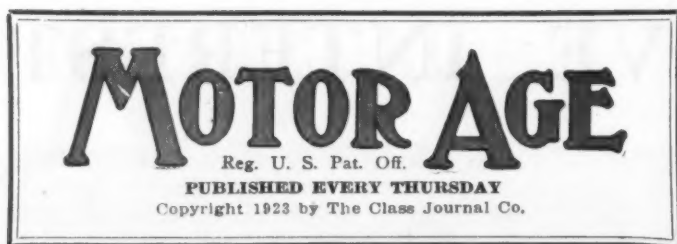
No this is not Uncle Enoch's old buggy without the hoss. It is the Stanley steam car—not the current model, but the one which made the natives sit up in 1900



Using the calliope to get church attendance. A New York minister made use of it on Broadway the other day and is said to have had much success



Ten thousand people looked over the Charlotte, N. C. show. Coming from a country which boasts of rich farm lands, there was much buying and the dealers wore constant smiles as they kept the book with the dotted line in it busy



Vol. XLIII

Thursday, March 1, 1923

No. 9

THE CLASS JOURNAL COMPANY

Horace M. Swetland, President

W. I. Ralph, Vice-President

E. M. Corey, Treasurer

A. B. Swetland, General Manager

David Beecroft, Directing Editor

Mallers Building, 59 East Madison Street, Chicago

BUSINESS DEPARTMENT

E. E. Haight, Manager

EDITORIAL

Clyde Jennings, Editor

B. M. Ikert, Technical Editor

DETROIT OFFICE
J. Edward SchipperWASHINGTON OFFICE
26 Jackson Place, N. W.

BRANCH OFFICES

New York City—U. P. C. Building, 239 West 39th St., Phone Penn. 0080

Detroit—317 Fort Street, West, Phone Main 1351

Cleveland—536-540 Guardian Bldg., Phone Main 6432

Philadelphia—1420-1422 Widener Bldg., Phone Locust 5189

Indianapolis—1212 Merchants Bank Bldg. Ph. Circle 8426

Boston—185 Devonshire Street, Phone Congress 4336

Cable Address.....Motage, Chicago
Long Distance Telephone.....Randolph 6960

SUBSCRIPTION RATES

United States, Mexico and U. S. Possessions.....	\$3.00 per year
Canada.....	5.00 per year
All Other Countries in Postal Union.....	6.00 per year
Single Copies.....	35 cents

Subscriptions accepted only from the Automotive Trade

Owned by United Publishers Corporation, Address 239 West 39th St., New York; H. M. Swetland, President; Charles G. Phillips, Vice-President; A. C. Pearson, Treasurer; Fritz J. Frank, Secretary.

Entered as second-class matter Sept. 19, 1899, at the post-office at Chicago, Ill., under the Act of March 3, 1879.

Member of Associated Business Papers, Inc.

Member of the Audit Bureau of Circulations.

Battery Ethics

THERE is a certain man in a certain town who conducts a very excellent battery establishment.

We asked this man what his greatest trouble was. His answer was surprising. He said:

"Keeping my line."

"You don't mean to say," was the natural comment, "that the ——— Company threatens to take this line away from you when you run this kind of a place?"

"Oh, no; that's not it," said the battery man. "The trouble is fighting off men who want to replace this line I handle with theirs.

"You see, it is like this: I like to be courteous to every one who calls on me. Also, I like to learn all about batteries, good and bad, that I can. So when a factory representative for any battery comes along, I give a little time to him to hear the latest news, find out if he knows anything new about batteries, and then, trying to be firm, I tell him that the ——— Company treats me well, I like their product and their business methods and without a real reason I would not change.

Then he begins to talk about longer discounts, special dating and many other things, and sometimes I have to get mean to get rid of him, and then the whole day is spoiled. I can handle the worst kicker with much more peace of mind than I can a man who is trying to undermine the other man with special favors.

"The worst trouble with the battery business today is the effort of battery makers to steal each other's dealers. The turnover must be very costly. I know it would be to me and to the ——— Company. So I am sitting tight and trying to make money for both of us. I sort of figure that we are in partnership in this territory."



Of six and a half million farmers, three and a half million use cars and advocate improved highways.



Tire Prices

IN the most recent copy of the Tire Rate Book are listed 30x3½ Non-Skid Fabric tires and Cord tires on a progressive price comparison basis. A review of these prices is almost alarming.

In the Non-Skid Fabric tires the lowest priced tire is listed at \$8.75 and the highest is \$24.75, the difference or spread of prices being \$16. Exactly 100 prices quote on 218 tires are in this list and 13 makes or brands are listed at \$10.65 and 11 at \$11.95.

In the Cord tire list, 356 brands are listed and the price range is from \$9.95 to \$30, a spread of \$20.05. In all, there are 113 prices for these similar articles of merchandise. The greatest number at any one price is 36 at \$16.50. There is no close second.

This is a most amazing showing for articles that are so nearly the same in materials and design. In each case there is practically a 200 per cent increase in price from the lowest on these lists to the highest.

We have within the last few months asked several men experienced in tire manufacturing work how much better or worse a worthwhile tire could be made than an average tire. The answers have been practically the same, 25 per cent. If these estimates are correct, it would appear that the price spread shown in these lists are not honest and that on their face they indicate an effort to overcharge the public or to print on the merchandise prices that are not intended as a guide for sales, but merely for the purpose of price cutting.

In any case, we cannot see in this price spread a good merchandising tendency.



The automobile gives employment to hundreds of thousands, recreation and useful service to millions.



Courtesy—A Strange Word to You?

IN "Squeeks & Rattles" a few weeks ago, this incident was reported:

Scene: MOTOR AGE Telephone Information Service.

Garage man: "Who handles the blank line of tires?"

Information: "The Courtesy Automotive Service Co."

Garage man: "How do you spell that name?"
(Information spells it four times and then explains what it means.)

The caption over this was given as "A Strange

Word" and we wonder that anyone should have such a time with a word that means so much to them. We would like to go into the garage whose proprietor knew so little about his business and tell you of our reception, but, unfortunately, there is no way of looking the man up.

When one stops to consider this incident, and, take it as it actually happened, there is something else beside the humorous side to look at. There is a pathetic element to it. Anyone who does not know the meaning of "courtesy" and attempts to do business with the American people might just as well "cease firing," for, if you would succeed as an automotive dealer or as anything else, it is well to take Noah Webster into partnership at least as far as this is concerned:

"Courtesy—An act of kindness or favor performed with respect."



We need nation-wide traffic signals and elimination of unnecessary warnings.



Straight Shooting

THERE is much said in the automotive dealer world today about the great need of a better understanding of merchandising costs and profits; about the need of more men who admit and act upon their obligation to customers and the public as a whole. This is a wholesome discussion and can bring only good results. It is just such a discussion that the organization of the National Automobile Dealers' Association, with its selective system, is calculated to bring about.

It is interesting to read in General Manager Vane's annual report that the N. A. D. A. has been having some experience in its own membership with automotive dealers who apparently do not realize their obligations. One dealer ordered some insurance placed through the insurance department of the N. A. D. A. Inspectors and others put in two weeks getting the necessary information about this man's place of business and 17 locations of his property. The policy was issued to him at a cost that would have meant a saving of \$19,000 compared with what he had been paying.

After this was done, the policy was cancelled without explanation. Apparently this dealer used the N. A. D. A. insurance department as a means of getting a better rate from his local insurance agency.

Obviously, here is a large merchant who does not take a wholesome view of his obligations. It will be interesting in time to see which of the merchants cannot stand the high ethical pace of the N. A. D. A.



134,000,000 tons of farm products are hauled yearly by motor transport.



Logic in Trouble Shooting

PROBABLY in no other phase of automotive repair work is logic more necessary than in that of the electric system. A broken driveshaft, axle or leaking carbureter, as a rule, suggest obvious repairs,

but what to do when there is no spark or lights is something which calls for investigation before any remedy can be applied.

In shooting electrical troubles there always is a logical way to proceed. Too often this is not done. The other day a car owner said he had spent quite a sum of money to have a case of mysterious electrical trouble fixed, only to find that the original source of the trouble had not been discovered. His trouble had been that the engine would not start at times and he had to be towed to a garage several times. By working around with the wires, distributor and so forth, the engine eventually would start again. New distributor points had been installed and other things done to effect a remedy.

Still, once in awhile the engine would not start. So the car owner one day, in filling the battery with water, happened to touch the cable grounding the battery to the frame of the car. The cable was loose in the terminal which was soldered to the car frame and, while there appeared to be a good mechanical connection, electrically it was very poor.

Thus, when the car was stopped in certain positions, very likely the cable pulled away slightly from the terminal and there was no contact to complete the circuit and the engine would not start. An experienced trouble shooter first would have inspected the battery and its cable connections, to make sure that the source of the current was not interrupted. The battery is the logical thing from which to start in shooting electrical troubles.



To see ourselves as others see us is not always flattering, but it is sometimes economical and always wise.



What the Schools Need

THE letter was hard to read and many words were misspelled. The writer claimed to be connected with a state trade school, and said that he would soon be put on the teaching staff. He further stated he was a graduate of one of the much advertised automobile schools. We thought it a hard case, both for the school where he had studied and the one where he was joining the faculty until we came to the last part of the letter. Here he asked us to explain the general theory of carbureters. Then we knew it was a sad story.

Schools are needed so that the industry may continue to have a better and better class of mechanics available for use in maintenance establishments, but it is not the type here illustrated that is going to make the service manager's job easier.

The man in question is doubtless incapable of mastering mechanical details, but schools are too prone to get instructors on a price basis, and turn out students with gold sealed diplomas in their hands and nothing in their heads.

Greater interest on the part of state and national educational organizations, combined with the cooperation of the automotive industry, is needed to supply real schools that will turn out real men.

Atlanta Show Stirs Southern Sales

Interest Equal to That of 3 Years Ago, Say Dealers

Upward Trend of Industry Through- out South Reflected in Buying Spirit of Visitors

ATLANTA, Ga., Feb. 24—One of the largest and best shows that has yet been held in the southern field, seems to be the consensus of opinion among the visiting dealers and the general public attending the fourth annual Southern Automobile Show, held Feb. 17 to 24, in the Auditorium at Atlanta.

There were many more exhibitors than usual in all three divisions—passenger cars, trucks and accessories—with attendance figures well above the mark of last year. By the construction of a mezzanine balcony, something over 5000 additional square feet of floor space was provided, making the show in square feet of space at least the largest display ever held anywhere in the southern field.

As to sales on the floor during the show, and obtaining of new prospects, many of which will develop into later sales, a canvass of the exhibitors seems to indicate that this business was considerably better than either last year or the year before, and on a par with the sales of three years ago when the industry was passing through a period of unusual prosperity. A more concerted effort toward sales was made this year than at any of the three previous shows, and for the first time, the southern show actually assumed the proportions of a national event.

One of the interesting features of the show was the combination Ford and Lincoln exhibits, occupying several thousand feet. There were more than \$100,000 worth of Lincolns on display, and the first two days of the show the dealers reported eleven of these cars actually sold, to be immediately delivered.

In the automobile show sections of the three Atlanta papers on Sunday, Feb. 18, the leading Atlanta banks published a co-operative advertisement expressing their whole-souled confidence in the stability of the automotive industry. This ad was headed "Changing the Outlook of a Nation," and traced the development of the industry from 1903 to the present date, showing what the automobile has done for the South and for the nation. "The Motor Car Has Increased the South's Educational and Religious Facilities, and Given Every Farmer a Nearby Market," another subheading stated, and then went on to show how this has been accomplished, why the automobile had become an economic necessity. "The banks of Atlanta are glad of this opportunity to commend the spirit that has made the Southern Automobile Show possible," the advertisement concluded.

Banks co-operating in this ad were the Atlanta National, Fulton National, Citizen's and Southern, Fourth National, Lowry Bank and Trust Co. of Georgia, and the Atlanta Trust Co., six of the largest financial institutions in the South.

Better Service Association Is Formed in New Orleans

NEW ORLEANS, Feb. 24—An "organization with teeth in it" has just been formed by service station men and garage owners in this city. Thirty-four concerns were represented on the charter of the Automotive Service Association organized this week for the purpose of bettering conditions in the service station and garage business.

The new association aims to obtain better discount on parts purchased by service stations and garages, more favorable insurance rates, better legislation affecting the automotive trade, and to establish a system of co-operative buying for members of the organization. A credit bureau is to be opened by the association, it is announced, in order that accurate information as to the ratings of customers may be obtained, and to eliminate losses due to uncertain charge accounts.

Edward Y. Hill, of the Mansfield Service Co., was elected president of the association; B. W. Cason, garage owner, vice-president; H. Walther, Jr., of the Walther Battery Service Co., secretary; W. D. Rollins, Jr., of the White Garage Co., treasurer.

Advertising Men to Advocate Listing of "Delivered" Price

LOS ANGELES, Feb. 24—The agitation concerning advertising automotive products showing local delivery prices has become so pronounced that the California Advertising Service Association, at its recent convention, took up the subject and adopted a resolution, a copy of which has been placed in the hands of all members of the Los Angeles Motor Car Dealers' Association.

In its resolution the Advertising Service Association states that the quotations of the factory prices in local advertising are misleading and not in accordance with the ethics of the association.

GOOD SHOW AT OTTAWA, ILL.

OTTAWA, Ill., Feb. 24—The annual show of the Ottawa Automobile Dealers' Association took place at the Armory Feb. 15, 16 and 17. Sixty cars were on display and, despite the bitter cold weather, the attendance was large. Dealers from points outside of Ottawa, in La Salle county, were permitted to enter and a number took advantage of the opportunity. A number of attractive accessory, oil and electrical and battery exhibits added to the attractiveness of the scene. A musical entertainment was provided for each evening.

Columbus, O., Show Is Notable Success; 148 Cars Exhibited

A. B. Coates, Manager of the Show, Is Credited With Large Attendance and Many Sales

COLUMBUS, O., Feb. 23—The annual automobile show held in Memorial Hall, Feb. 15 to 22, was a notable success, due largely to the careful arrangements made by A. B. Coates, manager for the Columbus Automobile Dealers' Co., which has charge of the exhibit. In all, 148 cars were shown, of which 74 were open models. As was the case last season, open cars only were displayed during the first part of the show and on the Sunday intervening a complete change was made and enclosed models only were shown from Feb. 19 to 22.

It was a "buying crowd" which flocked to the hall, as the former outside feature of a style show and special entertainment was done away with. An orchestra which rendered popular and classical music was about the only entertainment feature.

Features were prizes given to the salesmen making the most sales during the exhibit as well as those making the best impression. These prizes were given both for the open and closed sections of the show. Passenger cars only were shown in the main portion of the hall, while the balcony was given over to the usual display of accessories. The hall was attractively decorated with Bohemian colors. The plan was most artistic. The lobby of the hall was decorated with panels showing a trip around the world by automobile.

Sales on the floor during the entire show were more numerous than for years. This applies to all classes of cars, but more particularly to the moderate priced models ranging from \$750 to \$2000. With business conditions improving in every way, orders were numerous and all dealers unite in predicting a brisk spring season.

237,000 DURANT STOCKHOLDERS

NEW YORK, Feb. 24—Durant Motors has added 12,642 "partners" to its stockholding family, a high water mark, which brings the total number of stockholders up to 237,000. This rush is attributed to the fact that the sale of Durant stock at \$15 is being withdrawn in several states, while in others withdrawal will follow shortly.

So far this month more than 4000 Stars have been turned out and a total of 11,000 will be hung up for February. To date there have been 22,000 Stars manufactured, the mark at which the company is shooting being 231,000 for the year 1923. Production of Flint and Princeton cars will start in April, it is announced, while the manufacture of Durant fours at Elizabeth is about to start.

Murphy Sets Record at 115 M. P. H.

Some Makers Approaching Near Capacity Production

Parts Purchases Indicate Schedules Will Be Rapidly Increased As Spring Comes On

NEW YORK, Feb. 26—Indicative of the movement among motor vehicle producers to sustain production on high schedules is the report of the Motor and Accessory Manufacturers' Association, showing that in January, sales of parts to car and truck manufacturers amounted to \$45,451,950, an increase of 31 per cent over the previous month and proving more than twice as great as the business transacted by its members in January of 1922.

Collections reflect excellent conditions among parts purchasers, past due accounts having been reduced 29.33 per cent from December, which in turn reported a substantial decrease from November. The receipt of orders is pressing the parts makers toward capacity operations, present business being regarded merely as a forerunner of what may be expected as production schedules among car builders mount to peak proportions.

Program at car producing plants now are in advance of those followed in January, when output totalled 221,679, although on account of the fewer working days, February is not likely to equal that figure.

Retail buying continues active, with further expansion of sales noted as automobile shows reach out to cover the entire country. Dealer attendance is one of the chief features of the exhibits in distributing centers and evidences the extent of car interest among the smaller communities. On the basis of orders taken at the shows and the general trend toward increased buying, car makers are scheduling output that with some of the major producers should reach plant capacity next month.

While enclosed models maintain a strong hold among sales, approaching spring has stimulated the demand for open models. Dealers are absorbing the output of the latter type, partly for current business, but to a large extent to be in readiness for the anticipated seasonal demand.

For the same reason there has been a somewhat better tone in the truck branch of the industry. The January output of 19,206 was approximately twice as great as that for the same month of last year and from now on a pronounced forward movement of schedules may be expected. With new fields opening up and conditions not only in business centers but in agricultural districts improving, truck manufacturers will experience a marked revival in demand.

SERVICE MEN ELECT OFFICERS

SPRINGFIELD, Mass., Feb. 24—At the annual meeting of the Springfield Automotive Service Association, these officers were elected: President, Harry Dobles, Packard Motor Car Co.; vice-president, Nicholas J. Miller, Stoddard Motor Car Co.; secretary, Lewis H. Reed, Chandler Motors of Springfield, Inc.; treasurer, Howard P. Gates, Reo Springfield Co. The policy of having frequent talks by authorities on automotive topics is to be continued, and the members at their next meeting are to be addressed by Maurice Olley, chief engineer of Rolls-Royce, on "Automobile Designing."

1923 HIGHWAY ESSAY THEME

WASHINGTON, Feb. 24—The Highway Education Board announces that "The Influence of Highway Transport Upon the Religious Life of My Community" will be the subject of this year's essay contest. The prize is the H. S. Firestone University scholarship, which is valued at not less than \$4,000 and is intended to defray tuition and all other reasonable expenses for a course at any college or university the successful contestant elects to attend. All students of high school grade are eligible.

MILES TO VISIT TUT'S TOMB

NEW YORK, Feb. 24—Samuel A. Miles, general manager of the national automobile shows, has booked his passage for March 10 for his annual visit to England and France. His plans contemplate picking up Arthur E. Lumsden, European manager of the B. F. Goodrich Co., and then journeying to Egypt and visiting the tomb of Tutankhamen.

CENTRAL WISCONSIN SHOW

WISCONSIN RAPIDS, Wis., Feb. 26—Fifteen local distributors and dealers have organized a committee to stage a central Wisconsin show in the Armory at Wisconsin Rapids, from March 8 to 11, under the executive direction of Fred C. Ragan, who successfully handled a show in 1920 when the first local exposition was held.

ADD 243 MILES TO LINCOLN WAY

DETROIT, Feb. 24—Reporting on its accomplishments in 1922, the Lincoln Highway Association states that 243 miles of road were built last year at a cost of \$4,678,041.71 and that \$1,368,126.39 was spent in maintenance. It is estimated that by the end of 1923, more than \$50,000,000 will have been expended on the improvement.

G. M. C. VOTES DIVIDEND

NEW YORK, Feb. 24—Directors of the General Motors Corp., at their meeting here, declared a dividend on the no par value common stock of 30 cents a share for the first quarter of 1923, payable March 15 to stockholders of record at the close of business March 3, 1923.

Winner of 1922 Championship Takes Speedy Race on Coast

Opens the Season by Doing 250 Miles in Durant Special Without a Stop at the Pit

LOS ANGELES, Feb. 26—Setting a new world's record for 100 miles and over, Jimmy Murphy won the 250-mile race at Beverly Hills speedway yesterday with an average of 115.8 miles an hour. He covered the distance in two hours, nine minutes and 43 seconds. Bennett Hill was second, only half a car length behind.

Murphy drove a Durant special and Hill a McDonald special. Murphy's car has a Miller eight-cylinder engine and Hill's car a Duesenberg eight. Ralph De Palma, in a Duesenberg special, was third, two laps behind Murphy and Hill. Eddie Hearne, in a Durant special, was fourth, Frank Elliot, in a Leath special, fifth, and Tommy Milton, in a Miller special, sixth.

Fifteen cars, all in the 183 cu. in. class, started, and nine finished. The other entrants were: Dario Resta, Leon Duray, Kline, Earl Cooper, Durant, Harry Hartz, Wade Morton, Snoddy, and Jerry Wonderlich.

Neither Murphy nor Hill made a stop at the pit and this helped their record-breaking performance. De Palma drove one complete lap on a flat tire and the loss of time could not be made up. Cooper turned the fastest lap and was leading at 150 miles with an average above 116 miles an hour, but the strain was too much for his car and he was forced out a few laps later.

Preceding the start of the race, Chairman Schimpf, of the American Automobile Association Contest Board, presented Murphy with a medal emblematic of the 1922 race championship. Yesterday's race opened the 1923 season and Murphy starts off with 500 points as a result of his victory. He also won a purse of \$9000. Hill got \$5000 for second place. The total purse was \$25,000. Approximately 50,000 persons witnessed the race.

Automotive Mechanics Start a National Organization

JACKSONVILLE, Ill., Feb. 24—An organization known as the National Association of Automotive Mechanics has been formed here. The officers are: President, C. M. Strawn, Jacksonville; vice-president, C. G. Wright, Springfield, Ill.; secretary-treasurer, E. J. Kumle, Alexander, Ill.

The plan is said to be to organize branches in cities throughout Illinois and then to expand the organization to a national scope. Three years' experience as an automotive mechanic will be a prerequisite to membership, it is said.

Twenty-six Cars Enter Fuel Consumption Race in France

Tours to Be Scene of Contest of Fuel Powers of Various Automobiles

PARIS, Feb. 3—(By Mail)—Twenty-six cars have been entered in the three classes provided for the French Grand Prix fuel consumption road race, to be run at Tours on July 1, preceding the 500-mile 122-cubic-inch race. In the light two-seater class, with a weight limit of 771 pounds and fuel allowance at the rate of 39.3 miles to the American gallon, the entrants are six Aries, four Salmson, three Mathis, one Senechal and one Phrixus.

In the light four-seater class, minimum weight 1,984 pounds and fuel allowance at the rate of 23.5 miles per gallon, the contestants are three Aries and three Peugeot cars. The big car class, with a minimum weight of 3,086 pounds and fuel allowance 15.7 miles to the gallon, has as competitors an Aries and three Peugeots. The race will be run with only one man aboard, but with ballast representing either one or three passengers, according to the class.

Two Ford specials have been entered in the four-seater light car class, but do not figure on the official list, for the rules stipulate that the race is only open to automobile manufacturers. The Montier Co., which has fitted a special head to the Ford engines and made various changes in the chassis, claims that it is entitled to this designation. Being in doubt, the Sporting Commission of the French Club proposes to refer the matter to Henry Ford.

Prize Winners in Red Seal Battery Contest Are Announced

NEW YORK, Feb. 26—Prize winners in the Red Seal battery contest are announced by the Manhattan Electric Supply Co., Inc. Cash prizes were offered in three different contests. One was a window display contest open to dealers; another was a letter contest for jobbers' salesmen and the third a contest for the public, the conditions of which called for finishing a sentence laudatory to the Red Seal battery.

In the window display contest the prize winners were: Louis D. Rubin Electrical Co., Charleston, S. C.; George A. Myers & Co., Inc., Paterson, N. J.; Busch Hardware Co., Chicago; H. L. Miller Co., Pasadena, Cal.

In the contest for jobbers' salesmen the winners were: W. J. Teehey, Richards & Conover Hardware Co., Kansas City, Mo.; Charles A. Byers, Faeth Co., Parsons, Kan.; Harry H. Goldstein, Lowe Motor Supply Co., Hartford, Conn.

"Thirty years of experience are back of the seal" was the prize winning sentence in the contest open to the public, the winner being Louis Peine of Houston, Tex. Second prize went to Ralph E. Turner, Medford, Mass., with "It re-

tains Nature's energy under seal," while "Red Seal outside means more energy inside" was the contribution made by W. E. Long of Sterling, Ill., winner of third prize.

Anti-Race Bill Passed By Indiana Legislature

INDIANAPOLIS, Feb. 26—The bill prohibiting commercialized sports on Memorial Day, including the 500-mile speedway automobile race, was passed today by the House of Representatives. It now goes to the Governor, having already passed the Senate. There is another bill in the legislature to permit the city of Indianapolis to declare a special holiday for the race.

LAFAYETTE GETS WISCONSIN CHARTER

MILWAUKEE, Feb. 26—Consequent upon the transfer of the entire works and headquarters from Indianapolis to Milwaukee, the Lafayette Motors Corp., an Indiana corporation, has applied for a charter in Wisconsin as a foreign corporation. This has been granted. The application gives the capital stock as \$3,000,000 first preferred, \$4,000,000 second preferred, and 30,000 shares of common without par value.

NEW TRANSPORT TRUCK MODELS

MT. PLEASANT, Mich., Feb. 24—Some changes have been made in the Transport truck line for 1923. The line will be in six capacities, nominally rated at 2000, 3000, 4000, 6000, 7000 and 10,000 lb. The 2000 and 6000 lb. trucks are equipped with Continental engines and the other models are now fitted with the new Buda removable head type engine. United air cleaners are now standard equipment. Another change is the incorporation of silico manganese alloy steel springs in place of carbon steel on the 1-ton truck. The universal joints are now Blood Bros. The prices will be announced at a later date.

BIG SOUTHERN MERGER

BIRMINGHAM, Ala., Feb. 26—The consolidation of the Drennen Motor Car Co. and the Birmingham Motor Co. of Birmingham is said to bring together the South's largest automobile concern. This concern is distributor for Cadillac and Buick automobiles and Federal trucks.

The officers of the concern, under the consolidation, are H. A. Drennen, president; Sam Jones, vice-president; Don Drennen, vice-president; C. W. Drennen, treasurer, and J. W. Johnson, secretary and auditor.

Sam Jones is in charge of the sales of the Cadillac "division"; Frank Pape, the Buick, and Stanley Green, the Federal truck.

GASOLINE UP AGAIN

CHICAGO, Feb. 24—The price of gasoline was increased one cent here this week, the retail price now being 22 cents a gallon. This is the second increase in a few weeks.

Car and Truck Output of Last Month Greater Than Year Ago

Total Revised Production for 1922 Is Given as 2,334,790 Cars and 242,975 Trucks

WASHINGTON, Feb. 24 — Increased output for automobiles during January is reflected in the official report of the Census Bureau made public today. Production of passenger cars was approximately three times as large as January of last year and production of trucks almost doubled. The government figures give the January output of cars at 221,697, as compared with 206,372 for December, 1922. A slight reduction in truck production was noted as the January totals were 19,206 as against 20,035 in December.

Total revised production for the year 1922 amounts to 2,334,790 passenger cars and 242,975 trucks.

The following table gives the total production for each of the last seven months, with the corresponding figures for the same months of the previous year. With few exceptions, the reports each month are from identical firms and include approximately 90 passenger-car and 80 truck manufacturers:

	Passenger Cars		Trucks	
	1922	1921	1922	1921
July	224,770	165,574	21,739	10,766
August	248,118	167,705	24,420	13,080
September	187,637	144,669	19,173	13,648
October	216,039	134,734	21,466	12,813
November	215,297	106,042	21,656	10,010
December	206,372	70,690	20,035	8,307
	1923	1922	1923	1922
January	221,697	81,693	19,206	9,416

Industry Is in Prosperous Condition at Springfield, O.

SPRINGFIELD, O., Feb. 24—To keep up with orders, the Kelly-Springfield Motor Truck Co. is running three nights a week. Receiver Pearl A. Lewis states that the indications are that they will have to continue running at night to get out the orders coming in. The force has been increased 40 per cent during the last two months, Lewis said.

Twenty carloads of Westcott cars are being shipped to Eastern points by the Westcott Motor Car Co. as a result of the modification of the embargo on the Pennsylvania lines. The company has been held up on shipments by reason of the embargoes on the Pennsylvania and New York Central lines.

H. H. Durr, treasurer of the Victor Rubber Co., states that the company is increasing its production and that prospects are bright for spring trade. Good sized shipments are being made to the dealers. The new connections made during the past few weeks are now calling for shipments.

No increase has been made in the production schedule at the plant of the International Harvester Co. in this city. Charles H. Smart, superintendent, says the present output is 15 trucks a day. There has been no material change so far in conditions, he said.

Chevrolet Starts Production at Huge Janesville Plant of Samson Tractor Co.

Assembly of Cars Begins at Rate of 25 a Day—Schedule of
4500 a Month Set for Early
Summer

JANESVILLE, Wis., Feb. 24—Delivery was made Tuesday of the first Chevrolet automobile produced here in the immense factory which was erected four years ago by General Motors, for the Samson Tractor Co. These cars, three phaetons and three roadsters went to the Nitscher Implement Co., local Chevrolet dealer, and after leaving the factory they were driven through the streets, each car bearing a banner with these words: "First Chevrolet Cars Made in Janesville."

Thus is under way the transformation of the huge tractor plant, built at a cost of millions of dollars, operated for a brief period for the purpose for which it was intended and then allowed to lapse into idleness, from a costly liability of the General Motors Corp. into an active assembling unit of the Chevrolet Motor Co., in which the ultimate construction of upward of 4500 cars a month is planned.

It was last November that General Motors turned the plant over to its Chevrolet subsidiary. Up to that time the plant had been occupied by the Samson Tractor Co., although for a number of months operations had been practically at a standstill. The Samson business was moved into the quarters of the Janesville Machine Co., also a General Motors subsidiary, and in the weeks that followed, remarkable progress was made in re-equipping the plant for production of automobiles. A part of the plant was turned over to the Fisher Body Corp., for the manufacture of enclosed bodies for Chevrolet cars. Manufacturing preparations are under way in this unit and it is expected that the production of bodies will begin about March 1. Meanwhile all the cars produced are of the open type.

The first car came from the production line Feb. 14. Today production is at the rate of 25 cars a day. Plans call for the production of 2500 cars in March and officials hope by the first of May to be producing at the rate of 175 cars a day. When this point is reached, the Janesville plant will be one of the large assembling units of Chevrolet. The output of this plant will go largely to the Northwest. The first shipment by rail was four carloads to Minneapolis. The Chevrolet parts department maintained

in Chicago will be moved to Janesville.

The factory and executive personnel is being rapidly built up. T. E. Houghton is general manager in charge of production and A. P. Young is general sales manager. A skeleton organization was created by bringing experienced office and factory workers from other Chevrolet plants, but the greater part of factory labor and office help is being recruited in Janesville.

The company has taken over a clubhouse near the plant and established it as the Chevrolet Club, for the convenience of the officials and office personnel.

The files of the Janesville Gazette reveal some interesting history of the Samson plant, said to cover more than 300 acres of ground. In 1918 General Motors bought the Janesville Machine Co. for \$1,000,000, and almost immediately afterward announced its intention to build a huge tractor factory in the city. The first unit was completed early in 1919 and the production of Samson tractors was started on May 1 of that year. On Jan. 17, 1920, according to the Gazette, there were 2888 men employed in the Samson factory or on construction work, and 75 tractors a day were being made.

The depression that began late in 1920 struck agriculture a hard blow, and 1921 and 1922 were dull years for Janesville. "At the beginning of 1922," the Gazette says, "there was a heavy shadow over the city. It had been carried up to the seventh heaven when the General Motors Corp. came to Janesville and entered upon an extensive building program and established, in 1919 and 1920, the Samson Tractor Co."

"Between fifteen and twenty millions of dollars were spent in one way and another, it is estimated, in building up the Samson. At the close of 1920, throughout 1921 and a part of 1922, there was a lull in the business and some despondency in Janesville. For more than a year the tractor plant had either been idle or so nearly out of business that it no longer was counted as a large employer of labor."

From this condition of practical idleness the great factory has sprung into activity and additional men are being employed daily to increase the production of automobiles.

of which H. W. Skinner is president and W. T. Love secretary. Nearly all of the important lines of cars, trucks, tires and accessories were represented.

During the show an automotive equipment merchandising meeting was held, the arrangements being made by a group of jobbers. The "Shop Profits" film was shown and remarks were made by Neal G. Adair, editor of Motor World.

Merger of American Motors With Bessemer Co. Approved

New Company, Known as Bessemer-American Corp., Will Make
Cars and Trucks

PHILADELPHIA, Feb. 23—Stockholders have voted favorably on the consolidation of the Bessemer Motor Truck Co. of Philadelphia and the American Motors Corp. of Plainfield, N. J., makers, respectively, of the Bessemer truck and the American passenger car, and the merger will take effect immediately. The new company will be known as the Bessemer-American Motors Corp., whose securities will be issued to stockholders in exchange for their present holdings, in accordance with a pre-arranged plan.

Arrangements now are being made to consolidate the manufacturing operations of the two properties at one plant, but sales activities will be handled independently of each other, as heretofore.

The consolidated company will be headed by Proctor W. Hansl, prominent in the reorganization of American Motors, while Robert Burnsner will handle finances and also assume general supervision over the passenger car division. I. M. Lewis, formerly vice-president of the Hydraulic Steel Co., will head the truck division and also be responsible for production and general co-ordination of activities between the two organizations, as vice-president and general manager. E. J. Fithian, treasurer of the Bessemer Gas Engine Co., of Grove City, Pa., will continue to have an active part in the new organization, while E. F. Von Tackey of Titusville, Pa., and William Newcorn of Plainfield, N. J., will represent interests on the board.

Under single management it is estimated that the operating expense of both organizations will be substantially reduced by a corresponding gain in earnings, and as a part of the plan of consolidation the companies will be provided with additional working capital in excess of \$200,000, it is said.

Massachusetts Dealers' Sales Increase as Spring Nears

SPRINGFIELD, Mass., Feb. 24—Car sales have been on the increase in this district since the first of the month, and there is a decided gain in truck sales, as transportation companies are obliged to buy more equipment to handle the heavy traffic put upon them in the present severe road conditions. Sales and maintenance concerns look forward to a heavy business in the spring. Dealers have felt that the demand for cars was bound to be heavy, anyway, and road conditions being so bad this winter, many car owners have decided to discard their old cars and buy new ones as soon as the state of travel becomes normal. Cars that are retained will require a thorough overhauling with much replacement of parts to make them satisfactory.

UTICA SHOW SUCCESSFUL

UTICA, N. Y., Feb. 24—Despite the low temperature and heavy snows, the annual automobile show held here last week drew a large attendance and resulted in much business. The exhibit, which was staged in one of the buildings of the Savage Arms Corp., was sponsored by the Utica Motor Car Dealers' Association,

Illinois Motor Vehicle Law Made Target of Legislators

One Bill Provides For Governor on Cars Keeping Speed Below 35 m.p.h.

SPRINGFIELD, Ill., Feb. 24—The Illinois Motor Vehicle law is a target at which a number of legislators are aiming amendatory bullets. Three bills reported out of the house of representatives this week seek to do things to the existing statute.

Representative Fahy's measure, known as House Bill No. 164, would place a governor on all motor driven vehicles to prevent them from attaining a speed greater than 35 miles an hour, except in the cases of police and fire department cars.

House Bill No. 21, introduced by Representative Weiss, seeks to raise the speed limit for ordinary country driving from 30 to 35 miles an hour, but stipulates that a speed of six miles an hour must not be exceeded at turns in the highway where the driver's view is obstructed.

Whoever drives a car while in an intoxicated condition upon a public highway would be fined, upon conviction for a first offense, not to exceed \$200 or imprisoned not to exceed one year, in a bill introduced by Representative Jacobson. For a second offense he would be punished by imprisonment in the penitentiary for a term of not less than one year nor more than five years.

The same bill would provide drastic punishment for the man who is in an accident to any person or property and who runs away without giving his name, license number and place of residence. The penalty is a fine of \$500 or imprisonment not to exceed two years, or both fine and imprisonment. For a second or subsequent violation, such person would be imprisoned in the penitentiary for a term not less than one year nor more than five years. Upon conviction under the amendment, the clerk of the trial court would report same to the Secretary of State, who would suspend the license of the offender.

Contest for Star Franchise Is Staged in Southern City

NEW ORLEANS, Feb. 24—What perhaps was the most exciting siege of bids for the distributorship of an automobile ever known in this city came to light last week when it became known that more than 100 persons and concerns had been seeking the contract for the Star car. The Thomson Machinery Co., 534 Tchoupitoulas street, obtained the contract, and is acting as distributor for the Star and Durant in southern Louisiana.

Forty applications for dealerships in the city of New Orleans alone were filed with the Thomson company in a week after the distributorship was closed.

Eight dealers in the territory were signed up immediately. The Upper City Motor Co., 600 Carrollton avenue, in the most fashionable part of the city, is the first New Orleans dealer for the Star and Durant.

The Thomson company announced that it would not enter the retail business but would only distribute the Durant products. The company announced that deliveries already have been signed up with dealers as far ahead as next August.

Spring Automobile Salon for New York, May 13-20, Plan

NEW YORK, Feb. 24—Exhibitors in the annual Automobile Salon, which is held each winter in New York and Chicago have decided to hold a spring exhibition in New York and have selected May 13 to 20 as the dates. The affair will be held as usual in the Hotel Commodore and a change in policy has been made whereby a limited number of accessories exhibits will be permitted. Space reservations already have been made by Rolls-Royce, Locomobile, Cunningham, Isotta-Fraschini, Minerva, Duesenberg, Hotchkiss, Benz, Daniels and Leon Rubay, while such custom-built body manufacturers as Fleetwood, Le Baron, Holbrook, Locke and Healey have been booked.

SIoux FALLS SHOW NETS PROFIT

SIoux FALLS, S. D., Feb. 24—The annual automobile show closed Sunday night. Paid attendance was highest in the show's history, sufficient to cover all expense to the members of the association and leave a balance of about \$2000 which goes into the association funds to finance various operations. Many of the exhibitors will take part in the Wassertown, Hot Springs, Aberdeen, Deadwood and Mitchell shows which follow along in the next few weeks.

Shriners Prepare For Annual Jaunt to Convention

WASHINGTON, Feb. 24—Plans have been completed for the 1923 transcontinental Shrine motor caravan, which will drive from San Francisco to Washington, a distance of 5000 miles on a 42-day schedule. It is expected there will be 200 cars in the caravan, which is due to reach here June 4 in time for the Shriners' convention which is to be held June 5, 6 and 7. On the arrival of the motorists, the Zero Mile Stone, near the White House, which marks the beginning of all highways radiating from the National Capital, is to be dedicated by President Harding in the presence of thousands of Shriners. Capt. Bernard McMahan, manager of the National Shrine Touring Club, will lead the caravan across the continent.

Retail Sales in Milwaukee Much Heavier Than Last Year

Some Dealers Experience Greatest Selling Period in Their Histories

MILWAUKEE, Wis., Feb. 26—Sales for spring delivery on the books of local dealers as February draws to an end are variably 25 to 200 per cent larger than they were a year ago, according to figures reported by eight of the largest dealers in Milwaukee. Much success has been achieved in closing deals with prospects gained during the annual Milwaukee show a month ago. There seems to be a general feeling among prospective buyers that present prices may not hold long, and with news coming out every day that indicate existing lists will look cheap later on, a well defined demand is being experienced. Dealers are striving to keep allowances on used cars offered in exchange as low as possible and report good success in this partial solution of the used car problem.

Dealers in automotive equipment have experienced probably the best business in certain lines during the past ten days to two weeks in their entire history. This refers largely to garage heaters, auxiliary devices for carbureters and similar appliances, the demand for which amounted to a rush when the most severe cold wave in at least five years hit Milwaukee and Wisconsin about the middle of February. This condition had an adverse effect upon current demand for passenger cars, but in a good many cases doubtless promoted sales for spring delivery, so that the net result was favorable.

Darrah Uses Radio to Spread Power Farming Information

CHARLES CITY, Iowa, Feb. 24—Radio broadcasting stations are being used to spread the power farming idea by Dave E. Darrah, sales manager of the Hart-Parr Co. Darrah recently gave a 30-minute address on "The Place of Mechanical Power on the Farm," which was broadcast from the Minneapolis broadcasting station, through the co-operation of the Minneapolis Implement Dealers' Convention.

As a result of this address Darrah has been requested by the Sweeney Automobile School of Kansas City, Mo., to give a series of three addresses on power farming for broadcasting from its station on the evenings of Feb. 28, March 1 and 2. Darrah has accepted and announces the following subjects for the three lectures: "Beating Back Nature's Barriers," "Let the Buyer Prepare," and "Tragedy of the Unprepared." The broadcasting will begin each evening at 6:30 o'clock, on a 400-meter wave length. In these lectures Darrah makes no mention of his own or any other individual firm.

78 Bills Aimed to Regulate Automobiles in California

Measures Introduced in Legislature Cover Wide Range of Restrictions

LOS ANGELES, Feb. 24—That motor vehicle legislation will be an important matter during the present session of the California legislature was indicated by the fact that during the first half of the session a total of 78 bills bearing on this subject were introduced. Some of these bills would amend but a single section of the present Act; others would revise the entire Act, and virtually constitute a measure. The legislature now is in recess, but will resume March 5.

A complete change in the present method of motor vehicle taxation would be undertaken by sponsors of some of the bills. It is proposed to substitute a flat registration fee of \$2 with an operator's license charge of \$2 in lieu of the present charge of 40 cents per horsepower. It is proposed to raise additional revenue by means of a gasoline tax. There are two bills, however, that would levy an ad valorem tax on motor vehicle tires.

The campaign of education that has been directed at legislators by truck owners and dealers evidently has had an effect, as there is almost a total absence of such drastic measures aimed at trucks as was anticipated. One bill would reduce the maximum gross weight on state highways from 30,000 lbs. to 22,000 lbs. for four-wheeled vehicles; from 40,000 lbs. to 30,000 for six-wheeled vehicles. One bill would allow a four-wheeled truck 24,000 lbs. Two bills would permit no more than one trailer or semi-trailer. The influence of the railroads is seen in the introduction of the ton-mile tax bill as was advocated by the electric rail companies in their convention last summer. Another bill would put a tax of seven per cent on the gross receipts of all vehicles operating for compensation. If directly charged with being advocates of railroad legislation, it is not likely that the men who introduced these measures will force them and they are almost entirely without the support of public sentiment. One of the bills would levy a fine of \$100 on the first full ton overload and \$250 on each additional full ton overload.

Bills that would legislate in favor of the sale of accessories have made their appearance. One of these would require speedometers on all motor vehicles. One would require speed arresters, a mechanical device operating on the motor. One would require mechanical signaling devices on all inclosed cars. One would permit a ten per cent additional load on trucks equipped with cushioned wheels. A bill that will undoubtedly receive serious opposition would make necessary before a motor vehicle could be registered that the owner be bonded for

\$5,000 to cover liability in case of accident.

Then there are what are regarded as freak bills and to which there will be very strong opposition. One of these would require that an applicant for motor vehicle license submit three certain other data such as age and physical characteristics. One would require a thumb print on each operator's license. It is the aim of one member of the assembly to have the speed limit reduced to twenty-five miles an hour and make a jail sentence mandatory on the part of the court in case of conviction for exceeding the limit. A member of this legislator's family was killed by a speeder and that is admittedly his motive. Speed officers in California are accustomed to establishing "traps" on the highways and hiding out while awaiting the coming of a victim. This practice would have to be abandoned if one of the bills becomes a law.

Louisville Show Goes Over With Sales Marking Opening

(Picture on page 22)

LOUISVILLE, Ky., Feb. 24—From the time it opened Monday the fifteenth annual exhibition of the Louisville Automobile Dealers Assn. has so far proved a successful business show. Buying began almost immediately after the doors of the Jefferson County Armory were thrown open.

The attendance too, for the first days of the display was far grater than it was last year.

The opening hour of the show was shifted from 6 p. m. to noon to take care of the growing demands caused by increased attendance and more concentrated exhibits. The management of the show formed the opinion at the close of the 1922 show that the attendance had reached the maximum capacity of the Armory, considering the space available for exhibits and aisle space between. It was deemed advisable therefore, to open the show a half day earlier and thus relieve congestion to that extent.

On the main floor there were 244 automobiles, comprising 42 different makes, represented by 38 different dealers.

The color combination of the decorations this year was red and gold. On the main floor were two rows of floor lamps 30 feet high with shades 12 feet in diameter. Around the balcony were placed panel pictures giving phases of the development of transportation.

Although the majority of sales at the show included cars listed under \$1000 there was a fair demand for the higher priced models. Over 27,000 motor vehicles were sold in Kentucky in 1922 and it is predicted that a greater number will be sold this year. Tobacco and coal are in good condition making the Bluegrass State's outlook bright. Building activities for 1922 total \$18,000,000 compared with \$7,400,000 the previous year.

The annual meeting of the Kentucky Automotive Trade Assn. was held at noon Tuesday.

Methods of Increasing Fuel Economy Explained by S.A.E.

Results of Study Made by Research Department Forwarded to Senate Committee

NEW YORK, Feb. 24—The research department of the Society of Automotive Engineers has completed the statement it has been preparing for the LaFollette senatorial committee which is investigating the gasoline situation. The paper has been forwarded to Washington for the consideration of the investigators.

The S.A.E., after reviewing the automobile situation and the development of motor cars, declares that fuel conservation can be had by improved carburetion, improvement in gasoline, better engines and education of the user of cars. Briefly, it says, the several factors which promote fuel economy may be summarized as follows:

(1) Universal adoption of means for maintaining the engine and the carburetor and intake system at the best operating temperature.

(2) The adoption, as rapidly as possible, of carbureting devices which can be adjusted once for all by the maker to supply automatically a correct amount of fuel as completely atomized as possible for economical operations under all conditions.

(3) An economically correct grade of gasoline supplied uniformly throughout the country but suitable varied, if possible, to meet climatic conditions. Uniformity of fuel would go far to make possible the adoption of the more economical carbureting systems suggested above.

(4) Education of the user of motor vehicles to the advantages which will accrue to him through fuel economy. These advantages are in reality much greater than the saving in fuel cost. They include also less wear on the engine, less carbonization, less upkeep cost and freedom from other minor annoyances.

(5) The gradual adoption of engines using higher compression ratios with resulting higher fuel economy. This can be accomplished only as improvements in design or in quality of fuel make higher pressures possible without engine knock, which at present limits the usable compression pressures.

(6) Servicing of automotive equipment to maintain it in satisfactory condition for economy of operation. This refers to the entire vehicle as well as the engine, and present conditions can be improved by education of the public and of the garage mechanic, and by improvements in the service facilities offered by the dealers.

"All of these factors, except, perhaps, the education of the general public, are receiving a continually increasing amount of study by the Society of Automotive Engineers and the manufacturers and we believe that much has already been accomplished in eliminating fuel waste," the statement concludes. "The necessity of meeting popular demands inconsistent with economy, and the difficulty of putting new developments into immediate production have retarded this accomplishment. Even more important, perhaps, is the fact that the average vehicle now in use is a product of two or three years ago, not of today."

South Dakota Assn. Acts Against "Trading Allowance"

Calls It "Deceit Upon the Public;"

**O. M. Phelps Re-elected to
Presidency**

SIOUX FALLS, S. D., Feb. 24—Condemnation of the "trading allowance" as a "deceit upon the public" was one of several important policies expressed in resolutions adopted here by the annual convention of the Automobile Trades Assn. of South Dakota.

O. M. Phelps of Huron was re-elected president. Other officers elected are: First vice president, E. J. Hanson, Watertown; second vice president, F. J. Varle, Deadwood; treasurer, E. R. Judy, Aberdeen. Directors: J. J. Carson, Wessington Springs; R. G. Coon, Sioux Falls; Ivery Dybdall, Brookings; George Lampberts, Rapid City; C. L. Voss, Mitchell.

The two day session held a variety of business subjects. Ray Sherman, merchandising director of the Automotive Equipment Assn., talked on merchandising and shop profits and showed the two films "Ask 'Em to Buy" and "Shop Profits."

Discuss Many Activities

L. M. Shaw, assistant general manager of the National Automobile Dealers Assn., discussed association practices and possibilities, used cars and practices, dealer financing and accounting, territorial analysis and present competition. He pointed out that on March 1, 1922, there were 345 automobile dealers in business in South Dakota and 556 in business Jan. 1, 1923. He asked the dealers if they realized that "this is an increase of 61 per cent in your competition?" He said this increase was evidence to support the growing sentiment that there are "too many factories and too many dealers in business."

In his visit here Shaw spoke at a dinner given to the state association officers by the Sioux Falls automotive equipment jobbers. Following this dinner the jobbers pledged financial and physical aid in building up the state association. Shaw also had a meeting with the Sioux Falls automobile dealers, nine of whom are "One of a Thousand Members" of the National Automobile Dealers' Assn. Five others are prepared to submit applications.

In the business session of the convention the directors were instructed to employ a man for full time secretary and manager. This originated in a resolution which was adopted unanimously.

One resolution was in harmony with and support of a resolution adopted by the N. A. D. A. Chicago convention, urging factories to "make surveys to determine the absorbing power of a territory" and base production accordingly. Another resolution condemned "forceful feeding" of dealers by factories; another urged dealers to confine trading of cars to a small list which territory study shows

are readily saleable; another urged the "cash basis;" another asked passage of a mechanic's lien law by the South Dakota legislature and another appeals to congress to abolish the war tax on automobiles.

A plan for immediately increasing the finances of the association was drawn up by the new board of directors, in preparation for employment of a manager. The auditing committee reported net balance on hand of \$1200 after paying all convention expenses.

At Mitchell will be held the April meeting of the state association. Other meetings will be in Deadwood and Aberdeen later in the year. In the Mitchell meeting will be a conference of presidents and secretaries of local trade associations in the state.

No Change in 1923 Auburn Personnel; New Directors

AUBURN, Ind., Feb. 24—No change in the personnel of the executives of the Auburn Automobile Co. was made at the annual meeting of stockholders. A. P. Kemp was returned as president and treasurer; J. I. Farley as vice president and director of sales; E. A. Johnson as secretary V. B. Walling as assistant secretary and J. Zimmerman as assistant treasurer. In addition to Kemp and Farley, the directors elected included William Wrigley Jr., H. H. Hitchcock, F. B. Hitchcock, J. H. Rose and Ralph A. Bard. R. H. Faulkner, formerly of the Nash-Cincinnati Co., has been named as sales manager, working in cooperation with Director of Sales Farley.

The company's annual statement shows current assets of \$191,891.51 and current liabilities of \$131,844.62 of which \$15,677.99 is the 1922 Federal income tax. During the year 1000 shares of preferred stock were purchased in the open market and retired, making a total of 5000 shares retired to date and leaving outstanding preferred stock at \$500,000.

DEALERS' WINDOWS WIN PRIZES

DETROIT, Feb. 23—The Oldsmobile Co. of Buffalo has been awarded first prize of \$50 in the contest staged by the factory for the best window display appropriate to the Christmas season. The Lansing factory branch took second prize of \$30, and the Oldsmobile Sales Co. of Washington, D. C., won third prize of \$20. Photographs of windows from Olds dealers in every section of the country were submitted in the contest, and the factory reports the contest to have achieved the results it sought—the inspiration to buy through attractively presented appeal.

WILL OPERATE TIRE PLANT

KEWANEE, Ill., Feb. 24—The Clauss-Bilt tire plant, inactive since the death of Charles Clauss, will be in operation in a week, according to James Endres, who has purchased a half interest in the Clauss Tire & Rubber Co.

Visiting Dealers Entertained At Eleventh Kalamazoo Show

**Officers of Michigan State Trade
Association Make Addresses—
Exhibitors Report Good Sales**

KALAMAZOO, Mich. Feb. 24—Kalamazoo's 11th annual automobile show, held under the auspices of the recently formed Kalamazoo Automobile Trade Association, closed last week. The attendance was between 8000 and 10,000, and that despite bitter winter weather for the two opening days and nights.

Local dealers are in a most enthusiastic frame of mind as a result of the undertaking, declaring that actual show sales far exceeded in number those made at any previous exhibition, while the prospects for future business are excellent.

"There has never been a show in Kalamazoo attended by as much interest" remarked R. E. Fair. "All members of the K. A. T. A. have been able to accumulate a large number of prospects and the sales for the next 60 to 90 days should be exceptionally large."

An entertainment program was offered at each afternoon and evening session. The K. A. T. A. also made the week of additional interest by staging the regular Chamber of Commerce membership forum, Friday noon, and bringing to this city Howard J. Clifford, of Flint, member of the Durant Motors organization.

In addition, on Thursday noon, luncheon was served at the Hotel Burdick for all southwestern Michigan dealers. On this occasion W. H. Philips, Grand Rapids, newly elected president of the Michigan Automotive Trade Assn.; W. W. Edensburn, Detroit, manager of the state organization, and H. E. Garlock, of Lansing, former state president, were presented, and spoke on organization work and the accomplishments of the state association in throwing numerous safeguards around the sales end of the industry.

R. E. Fair, president of the K. A. T. A., presided at both the dealers' and Chamber of Commerce luncheon.

While the main show was held in the armory, the Kalamazoo Automobile Salon was staged in the New Burdick arcade. Six dealers participated in this undertaking and it proved to be highly successful, well supplementing the usual exhibit.

SHOW AT EAU CLAIRE, WIS.

EAU CLAIRE, Wis., Feb. 26—The Eau Claire Auto Dealers' Association has fixed April 4 to 7 as the dates of the Northwestern Wisconsin automobile show, to be staged in the municipal auditorium. The first show was held in 1913 and the second in 1915, and due to war conditions, no effort was made in succeeding years until now. O. L. Darwin has been appointed executive chairman, assisted by Guy R. Wood and Al Jordan.

"Dealers' Day," Shining Event of Dallas Automobile Show

Large Attendance and Many Sales Mark Annual Spring Exhibition in Texas City

DALLAS, Tex., Feb. 23—Measured from the angle of attendance, the third annual spring automobile show of the Dallas Automotive Trades Association, held last week, was not as successful as the exhibition staged during the State Fair of Texas during the fall, but when taken from the viewpoint of business done, enthusiasm and interest, the show was far more successful than any similar event held by the local association. The attendance at the show during the fair was measured by the 700,000 which passed through the fair gates—they were just visitors and sight-seers. This time the majority of the visitors at the show were automobile owners and prospective buyers. They were there to see the latest word in automobile construction and with a view of owning a new car.

The estimated attendance at the annual spring show was 75,000.

At the show this spring 41 makes of cars and 168 styles were on exhibition. They were of the various types of 1923 construction. The Gray and the Star were among the new cars shown this spring in this section of the state.

That the show was a success from the standpoint of sales made on the floor was evidenced by announcements on the part of exhibitors that the show would have closed the first day if sales on the floor had included removal of machines from the exhibition. No definite figures were available as to the actual number of sales made during the show. It was said the sales made and orders taken for hurry-up deliveries would probably be around 750 cars.

People Enthusiastic at Show

That figure did not represent all the sales during the eight days of the show, however, as a number were made at sales rooms down town. Nor did it represent business to be done within the next few weeks. Dealers said the enthusiasm manifested on the part of visitors meant the disposal of several thousands of cars in the Dallas district during the spring.

One of the features of the show was "Dealers' Day," when some 900 automobile dealers from practically all parts of Texas and parts of Oklahoma, Louisiana and New Mexico were here. The day closed with a banquet attended by more than 700 dealers, including those from Dallas. At this banquet, sales problems, the used car problem, service problems and several other questions were discussed. Dallas distributors said that "Dealers' Day" would result in disposing of more cars in the Dallas district.

In connection with the display of automobiles there were on exhibition some

Garage Not Responsible for Theft of Car From It

SPRINGFIELD, Ill., Feb. 24—Judge Burton, in the Macoupin County Circuit Court, handed down a decision which is big with importance to garage proprietors. The proprietor of a garage at Bunker Hill, William C. Jacoby, was sued by Mark Clark, to recover the value of his automobile, left at the garage for repair, and which was driven away by a thief.

Judge Burton held that the garage proprietor was not responsible for the car and the owner must also pay a repair bill of \$600 which had accrued while the car was being overhauled. It is expected that the owner of the car will not accept this finding, but will take the case to the supreme court for a final ruling.

trucks and a varied line of automotive equipment. The show was held in the building erected for show purposes several months ago by the Dallas Automotive Trades Association.

M. A. M. A. Reports Called "True Barometers" of Future

NEW YORK, Feb. 26—A true barometer of manufacturing conditions at the start of what promises to be the industry's greatest year is had in the reports from members of the Motor and Accessory Manufacturers' Assn. on January's business, just compiled. Going by these, it is clearly apparent that the car builders are particularly busy at the present time and that they believe this condition will last for some time. They are buying equipment with a liberal hand and the parts people are rushed to meet the demand for their product.

The M.A.M.A. reports show that its members sold \$45,451,950 worth of automotive equipment during the month of January, 1923, which is a 31 per cent increase over December, 1922, and nearly three times as much as January, 1922, reported. December had shown a slight falling off over November, so it is apparent the car builders are starting the new year with a rush that promises to break all production records.

Snow Crushes Roof of Storage Garage

WESTFIELD, Mass., Feb. 24—A storage building of the Williams Automobile Co., Ford dealers, containing 35 cars, was crushed under a weight of snow and ice, practically demolishing many of the cars, while others can be salvaged. It was a two-story wooden structure, formerly a livery stable, 55 by 120 feet in dimensions. Damage to cars was said to be in the vicinity of \$10,000. The property was not insured against such a disaster.

Another Tire Price Increase On the Way, Is Makers' Belief

Akron Manufacturing Circles Expect March 1 to Witness New Elevation

AKRON, Ohio, Feb. 26—Although Akron manufacturers refuse to commit themselves, further increases in tire prices on March 1, or shortly after that date, are considered highly probable in tire manufacturing circles here. The principal factor which will enter into the new price elevations is, of course, the restriction placed upon crude rubber production by the British Government and the exorbitant export tax which American consumers of rubber must pay the British Government. The total amount of this tax in a year is variously estimated at between \$100,000,000 and \$500,000,000 a year.

Another factor which will enter into higher prices is the fact that labor conditions in Akron are such as to have necessitated action by rubber companies tantamount to wage increase. The Goodyear, Goodrich, Firestone and Miller Rubber plants all have put into effect programs of 10 per cent bonus payments to employees. These bonuses follow demands for wage increase which have been rejected by all companies. Labor turnover is heavier in the rubber plants of Akron than it has been for several years and manufacturers are endeavoring through the medium of the bonus to encourage steady employment and thus cut down the heavy cost entailed by a fluctuation of labor and an abnormal turnover every day.

A third factor in the probable price boosts on tires is the evidence of returned prosperity to the country. During the slump period the tire companies cut tire prices to rock bottom but now that more prosperous conditions are returning they feel they are entitled to a slightly greater margin of profit, as many admit they went a trifle too far in their reduction of prices a year and two years ago.

PARENTI SALE ORDERED APRIL 2

BUFFALO, Feb. 24—Federal Judge John R. Hazel has directed the sale of the Parenti Motor Car Co. plant and assets to the highest bidder on April 2. The lowest bid admissible is \$240,000. If the stockholders reorganize the automobile company before that time there will be no sale. The stockholders also have an opportunity to enter bids for the property.

Judge Hazel set aside the sale of the company to the Hanover Motor Co. of Hanover, Pa. for \$225,000.

TRUCK COMPANY TO EXPAND

BUFFALO, N. Y., Feb. 24—The Buffalo Truck & Tractor Co. is making plans for recapitalization into a \$3,500,000 concern. The company's plant, at Clarence, now covers seven acres, and the firm has purchased two more acres for further development.

1904 Reo Leads Parade of Company's Many Old Models

Was First Motor Car Seen in Saline County, Kan., Where Frank Brendle Used It to Haul Wheat

KANSAS CITY, Feb. 24—An old Reo automobile which was the eighth wonder back in 1904 when it was the first automobile ever seen in Saline County, Kan., where it hauled wheat and potatoes to market for Frank Brendle, led a parade of Reos of many ages through the streets of Kansas City the other day.

The parade was staged by J. Frank Witwer, president of the Southwest Motor Co., Reo distributor in Kansas City. Witwer bought the car about a year ago after having seen it exhibited in a pageant at Salina, Kan. He named it "Baby Marie," from the title "Baby Mary" by which it was known for many years to the people of Salina.

Thirty-two Reo passenger cars were entered in the parade, ranging from the model of 1904 to the latest 1923 product. Most of them were borrowed from their owners. Three trucks were entered, one having a record of 150,000 miles. Witwer had a photograph made of the old 1904 Reo beside a 1923 model. He also was fortunate enough to obtain an old photograph of the car loaded with grain for the market, taken back in the days when the car was doing yeoman service for Frank Brendle.

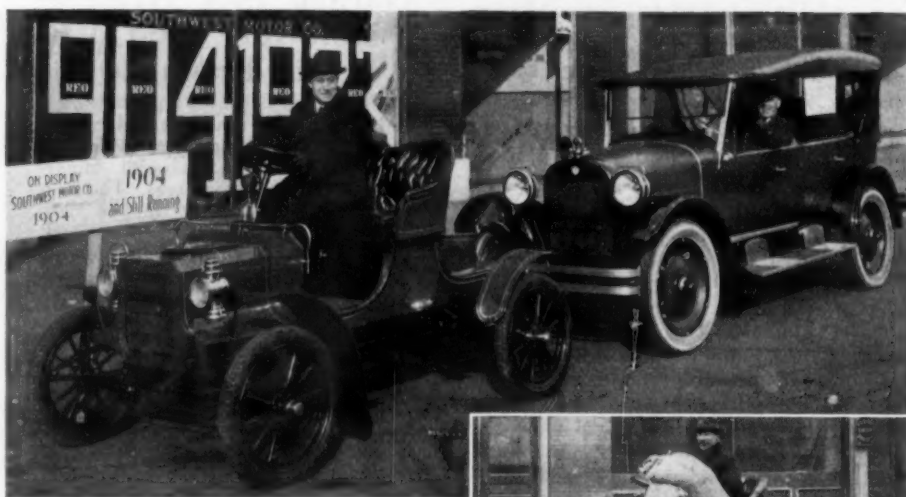
Reading (Pa.) Dealers Support High Business Ideals of N.A.D.A.

READING, Pa., Feb. 24—Officers have been elected by the Reading Automobile Trade Association as follows: President, O. W. Lindgreen, Willys-Knight; vice-president, A. R. Howard, Neel-Cadillac Co.; directors, J. M. Kalbach, Franklin; Harry Kohler, Buick; John Ceorbit, Hupmobile; Charles Hoffer and J. A. Darrow, Pierce-Arrow.

The association has just held an automobile show which R. C. Duffus, secretary-manager of the Pennsylvania Automotive Association, declares was the most successful in the city's history. After half of the receipts was returned to the dealers and all expenses were paid there remained a substantial sum in the treasury. Sales were surprisingly good at the show and some dealers already are fearful of a shortage of cars in the spring.

The Reading association has a membership of 55 automotive merchants who are heartily in sympathy with the high ideals of the automotive business set forth by the National Automobile Dealers' Association and the Pennsylvania Automotive Association. At a recent meeting here, attended by 155 Reading dealers and salesmen, addresses were made by C. A. Vane, general manager of the N. A. D. A., P. F. Drury, assistant manager of the N. A. D. A., and Manager Duffus of the Pennsylvania association.

The Old and New In Parade



At top is photograph of 1904 Reo standing beside the 1923 product of the same name. At right is an old photograph of the ancient car as it appeared when hauling wheat to market in Saline County, Kan., back in 1904.



RICKENBACKER ADDS TO FACTORY

DETROIT, Feb. 23 — Rickenbacker Motor Co. has completed the equipping of its new factory addition and the production line will now be extended the full length of the new and old plants. With the addition the company will have a capacity of about 50 cars daily and will reach this manufacturing pace by about March 1. During the year the company expects to build a minimum of 10,000 cars.

March will witness the fifteenth month of production at the plant. The company reports a steady enlargement of both its factory force and dealer organization. Manufacturing plans contemplate the continuance of specialization on the three models which the company is now building, a policy declared making for greatest economy for both factory and dealer.

BIG NASH SALES INCREASE

KENOSHA, Wis., Feb. 24—Shipments of Nash cars from the factories in the first month and a half of this year were equal to the total shipments for the first three months of last year, according to E. H. McCarthy, sales manager.

Total sales of Nash cars in 1922 were 40,000, McCarthy said, as compared with 20,000 in 1921. The company's manufacturing capacity has been greatly enlarged by the completion of the new plant for four-cylinder cars at Milwaukee.

VAST BUSINESS IN WHEELS

DETROIT, Feb. 24—Net income of Motor Wheel Corp. for 1922 was \$803,934 and gross business for the year \$11,918,853 according to the report filed at the annual meeting of the company this week. Directors and officers of the company were re-elected.

Approve Plan for Financing Pierce-Arrow Floating Debt

BUFFALO, Feb. 24—Approval of the plan for financing the floating debt of the Pierce-Arrow Motor Car Co. has been given by the stockholders. At the meeting which acted on the proposition it was reported that the company's current assets now amount to \$12,337,274, of which more than \$10,000,000 is in inventory account.

The plan which was drawn up for the purpose of paying off the company's bank loans and other floating debts, provided for the sale and issue of \$3,500,000 one-year 6 per cent secured notes, the creation of an issue of \$6,000,000 first mortgage bonds, \$4,200,000 8 per cent debentures and 15,750 shares of preference stock and 78,750 shares of additional common stock. Under the plan, none of the \$6,000,000 first mortgage bonds were to be sold, but \$4,200,000 bearing 7 per cent interest were to be pledged to secure the \$3,500,000 of one-year notes. The prior preference stock created will be distributed as a bonus to buyers of the debenture bonds. All of the securities have been underwritten by a syndicate of bankers representing the company. The bank loans which are to be liquidated amount to approximately \$7,150,000.

LOCKPORT (N. Y.) DEALERS ELECT

BUFFALO, N. Y., Feb. 24—The Lockport Automobile Dealers' Association held its annual election of officers at a recent meeting, naming the following: President, W. J. Swyers; secretary, Alfred Oldham; treasurer, George W. Timkey. Directors were named as follows: Harry Shannon, Chester Fenno, William Duell and Ray Owens.

BUSINESS NOTES

Percival Wilds has been appointed receiver for the Brook-Ostruk Co., Inc., New York, by Judge Learned Hand. The action was brought about by an equity proceeding instituted by the Consolidated Foreign Motor Car Co., Inc., which asserts a claim of \$8000. The liabilities are stated to be \$39,000 and assets \$73,500. The Brooks-Ostruk Co. is a manufacturer of automobile bodies at 225 west Sixty-Sixth street.

The West End Auto Service, 420 Second street, Rock Island, Ill., organized by J. A. Buzzard and Robert Ralston, has taken over the GMC truck agency for Rock Island, Henry and Mercer counties, Illinois, and Scott, Cedar and Muscatine counties, Iowa.

400 per cent stock dividend has been declared by the George W. Davis Motor Car Co., of Richmond, Ind., maker of the Davis Six. This is regarded as indicative of the company's strong financial position because, under the laws of Indiana, every dollar's worth of stock issued must be represented by an actual dollar of assets.

The Paul Rubber Co. of Salisbury, N. C., has opened a branch at 1627 south Michigan avenue, Chicago, to handle middle western territory.

Goodyear Tire & Rubber Co. is offering a new issue of \$14,505,000 8 per cent prior preference stock voting trust certificates at \$98 a share which is underwritten by a syndicate headed by Dillon, Read & Co., and including a number of other well known financing concerns. The issue is redeemable as a whole or in part at 110 and accrued dividends on sixty days notice.

Hancock Truck Tire Co., is a new concern recently opened for business at Nashville, Tenn. E. Cliff Hancock, until recently with the Firestone Tire Co., is president and manager.

The Waller Mfg. Co., Dubuque, Ia., has completed arrangements to transfer its Oelwein plant to the former home of the Dubuque Supply House, East Dubuque, between March 1 and 10, it was announced this week. The company manufactures various articles of automotive equipment.

The American Motor Body Co., has been organized at Dixon, Ill., and will open a plant at 1007 Lincoln avenue. The capital stock has been fixed at \$50,000. E. F. Johnson and R. D. Netherton are the promoters. The company will handle motor cars, accessories and trucks.

The Tractor-Train Co. of Los Angeles, maker of Moore transmissions, has taken over the Rocky Mountain Steel Products, Inc., manufacturer of Rocky Mountain brakes and six-speed transmissions for Ford cars and trucks, and will continue to manufacture and market the Tractor-Train Co. products.

The S. & S. Body Co., Detroit, and the National Body Co. of Bay City, Mich., have been merged under the name National Body Co., and will manufacture commercial bodies in Bay City. The company is capitalized at \$100,000 and has purchased a plant from the International Mill & Timber Co. Salesrooms will be maintained in Detroit and other truck centers. The company has been formed largely through the activity of the Bay City Chamber of Commerce.

The Victory Vaporizer Mfg. Co., has been organized at Cincinnati to manufacture and sell a device known as the Victory Vaporizer, the purpose of which is to cause better combustion of fuel in automobile engines. Officers of the company are; President R. W. Foster; secretary and treasurer, Geo. E. Tebbis; vice-president, J. C. Lueders.

Buckeye Auxiliary Spring Co., Toledo, O., which will manufacture shock absorbers, has incorporated for \$30,000 and will operate at 1612-20 Oakwood avenue. Production is to be started soon. Incorporators are Vernon C. Vogal, John Landgraaf, Neal H. Deeds, Clyde L. Deeds and Ralph E. Zeigler.

The Petroleum Motors Corp. has been organized at Rockford, Ill., and will manufacture engines for motor vehicles. Officers have been elected as follows: president, Chester A. Hams; vice president, T. G. Jackson; secretary, A. W. Sessi; treasurer, C. B. Schoenberger. The officers constitute the board of directors. Offices have been opened at Rockford and a suitable building for the manufacture of the motors is being sought.

The Cleveland Storage Battery Co., of Cleveland, has been incorporated with a capital of \$10,000 to manufacture and deal in storage batteries.

The General Automotive Co. of Akron, O., has been incorporated with a capital of \$10,000 to manufacture and deal in tires, tubes and tire accessories.

Eleven Plants of Standard Parts Co. to Be Auctioned

Properties Said to Be Worth Over Ten Million Dollars to Go at Receivers' Sale

CLEVELAND, Feb. 24—Eleven plants of the Standard Parts Co., each of which is equipped for manufacturing automobile parts and accessories, will be sold to the highest bidder on March 29, in the United States District Court in this city. The order for the sale has been issued by Federal Judge D. C. Westenhaver, who appointed receivers for the company in September, 1920.

The eleven plants are all in operation, are working on contracts and have orders to keep them busy for some time. The plants are said to be worth more than \$10,000,000, and they are the remaining ones of the \$20,000,000 corporation built up by Christian Girl, who left the company in 1920.

The plants will be sold subject to existing contracts and there will be no interference with work now going on. Orders will be filled promptly. The receivers will carry the plant along until the sale.

The issuance of the order here followed the unsuccessful attempt of stockholders to save their investment by raising sufficient capital to purchase the plants. Judge Westenhaver, before making the order, stated he hoped a way would be found to preserve the property for the advantage of creditors and stockholders. The sale will mean the dissolution of what has been regarded as one of the greatest single corporations in the world engaged in making automobile axles, springs, bearings and rims. Stockholders fear the sale will wipe out their \$20,000,000 investment, represented by \$6,439,000 in preferred stock and \$14,262,331 in common stock.

NEW FRANKLIN DELIVERIES

SYRACUSE, N. Y., Feb. 24—A new Franklin phaeton body is now in regular production and deliveries have already started to dealers. No changes are made in the chassis but the body is more roomy, the rear seat being somewhat wider and a total of 6 in. more length in the body. The hood has been made a good deal higher so that it is now practically in a straight line with the cowl. Other changes of a minor nature improve the appearance of the car in general. The price is \$1950.

FT. WAYNE SHOW IN MARCH

FORT WAWNE, Ind., Feb. 24—Arrangements have been completed for the holding of an automobile show at Concordia College gymnasium by the members of the Fort Wayne Auto Trade Association. The show will be held during the first week in March. Chester Schiefer is chairman of the show committee and the other members of the committee are R. H. Fitch, Ward Becker, C. H. Lines and L. G. Andrews.

Springfield Dealers Plan Elaborate Car Exhibition

SPRINGFIELD, Ill., Feb. 24—In a setting of the most notable decorations in the history of the state arsenal, the annual show of the Springfield Automobile Dealers' association was given on Feb. 22, 23 and 24. For the first time in years, the entire automotive industry of the city was represented, 24 dealers engaging space and exhibiting 80 of the latest models of cars, practically every make of importance in the country being shown. In addition to the display of cars, there was an attractive exhibit of accessories. Basil W. Ogg served as general manager of this year's show and much of the success is attributed to his ability.

Illuminated columns formed the keynote of the decorations. These columns were covered with vari-colored silk and numerous colored incandescent bulbs. The upper portion of the columns carried a Japanese trellis effect with vines and blooms artistically intermingled. Large flower pots on pedestals and filled with the same type of vine and floral decorations were placed between the exhibits. The effect was highly attractive and proved a strong factor in the attendance, said to be the largest of any show yet given by the Springfield dealers. It is expected that the show will be a valuable stimulant to spring business.

REDUCED FARE FOR OMAHA SHOW

OMAHA, Feb. 23—A special fare for automotive dealers who attend the Omaha automobile show, Feb. 26 to March 3, has been established by railroads here. It is not an open rate, but applies to automotive dealers and their families only, and is on the certificate plan. It applies to points where one way fare is 67 cents or more, and includes all points in Nebraska, Wyoming and South Dakota, west of the Missouri river; all points in Colorado, Fort Morgan and east; points in Iowa, Missouri, Kansas and South Dakota east of the Missouri river from which points the one way fare to Omaha is \$7 or less.

NO BUILDING FOR DECATUR SHOW

DECATUR, Ill., Feb. 23—Efforts to secure the factory buildings of the defunct Pan-American Motor Co. for the spring show of the Decatur Automotive Association have failed and, unable to get a location suitable for a display, the organization has abandoned its plans for a unit spring exhibit. J. A. Hedrick, president of the association, has been named representative of the automotive group to represent it in a Chamber of Commerce move to launch an armory building campaign which will provide a municipal auditorium and give space for future automobile shows.

CONCERNING MEN YOU KNOW

The Pilot Motor Car Co. of Richmond, Ind., announces the appointment of Geo. H. Lloyd as eastern sales manager with jurisdiction over the sale of its product on the eastern Atlantic Seaboard and all territory east of the Alleghany Mountains from Maine to Maryland.

Harrie T. Hickey, service expert of the sales, advertising and service division of the advisory staff of General Motors Corp., has left on a six weeks trip to England where he will seek to bring service on General Motors cars to the same degree of excellency as developed in America.

Lynn McNaughton, vice president and general manager of Cadillac Motor Car Co., is on a six weeks' tour through the western territory, his immediate objective being the San Francisco show. He will visit distributors en route, and following the show will cover the coast territory north to Vancouver, and south through Texas, Arizona and Louisiana.

John J. McNamara, automobile editor of the Boston Post for many years and one of the best known men in the advertising field, died last week of pneumonia. He caught cold just after returning from the Chicago Automobile Show.

Major Robert B. Parker, vice president and general manager of the Packard Motor Car Co. of Boston, has resigned to accept a position as president and general manager of the Packard Motor Co. of Philadelphia. He had been with Alvan T. Fuller, owner of the Packard business in Boston, for a number of years, working up from the mechanical department. As a West Point graduate he entered the war and won a commission as major. Lieut. Roy A. Metler, who began as a clerk in the Fuller organization, has worked his way up and succeeds Major Parker at Boston.

Bert E. Barnes, formerly of Brooklyn, N. Y., has been appointed advertising manager of the Williams Bros. Aircraft Corp., San Francisco, manufacturer of the Williams accelerator and the Williams Junior accelerator.

W. A. Amelung has been placed in charge of the Cleveland office of the U. T. Hungerford Brass and Copper Co. of New York, which has been opened in the Leader Bldg., Superior and East Sixth street.

R. C. H. Rupp has been elected president of the Maccar Truck Co. of Scranton, Pa., succeeding A. B. Warman, who becomes chairman of the board of directors. W. D. Woodworth formerly of the Packard Motor Car Co. and for years general manager of the Wood Hydraulic Hoist and Body Co. has been vice president and general manager, while C. A. Weymouth has been appointed director of sales.

Col. Fred Cardway, formerly vice president and general manager of the Packard Motors Export Corp., has been appointed head of all overseas trade of the Pierce-Arrow Motor Car Co., with offices at 342 Madison avenue, New York City.

Ramon V. Dix, for the past two years in charge of production in the advertising department of the Cadillac Motor Car Co., has been transferred to the Detroit branch of the company, where he will have charge of sales promotion, advertising and publicity for both the wholesale and retail divisions. Warren T. Mithoff, formerly of Earl Motors, Inc., succeeds Dix in Verne Burnett's department.

S. Whitworth, for the past five years assistant general manager of the Stutz Motor Car Co.

of America, has severed his connection with the Indianapolis concern. He has not announced his plans for the future.

H. L. Hurst, who has been assistant general manager of the General Motors Truck Co. of Pontiac, Mich., has been elected vice president of the company. In his new position he will be second in command at the factory, while O. E. Stoll, manager of the New York branch and a vice president of the company, will continue in charge of eastern territory. Hurst started with GMC as comptroller ten years ago. Prior to that he was in the farm implement business in Kansas City.

Major Robert A. White, formerly with Packard and Hudson in New York City, has been named as eastern representative of the General Tire & Rubber Co., of Akron, with headquarters in New York City.

Walter S. Kidd, former plant engineer of the Olds Motor Works, Lansing, Mich., has been appointed vice president and general manager of the Wilmington Auto Co., Wilmington, Del., distributors of Oldsmobile cars in that territory.

J. F. Kolb, Springfield, Ill., who is at the head of the vocational department of the state department of industrial education, addressed the automotive dealers of Peoria on Feb. 8, pointing out the advantages of vocational training for automobile mechanics. He will deliver the same address before the Bloomington dealers, March 5.

Thomas F. Conley, formerly retail salesman in the Philadelphia district for the White Co., has been promoted to take the place of A. S. Osborn as assistant district manager, the latter having been transferred to New York as assistant district manager in that territory.

M. D. Tracy, of the Philadelphia staff of the White Co., has been promoted to the position of manager of the Philadelphia wholesale department.

M. M. Gilman has been appointed general manager of the accessories department of the Packard Motor Car Co. of New York, succeeding A. C. Acker, resigned.

Henry A. Klein has joined the Eadie Trailer Corp. of New York and will take charge of standardization of design and production of the company's patented devices for trailers and other four-wheeled reversible tracking vehicles. The Eadie Trailer Corp. was formed recently to take over the Eadie Vehicle Gear Co., John M. Eadie being president of the corporation.

George H. Lloyd has been named eastern sales manager of the Pilot Motor Car Co., of Richmond, Ind., with jurisdiction over the eastern Atlantic seaboard and all territory east of the Alleghany mountains from Maine to Maryland. At one time Lloyd was general sales manager of the Velie Motor Co. and for the past four years eastern district manager for the Kentucky Wagon Manufacturing Co.

S. T. Thompson, general manager of the Duplex Engine Governor Co., of Brooklyn, has been elected secretary of the company.

Fred McWaters, formerly with the Willys-Overland branch in Atlanta, has joined the sales force of the Cruse-Crawford Manufacturing Co., dealers in Birmingham for the Willys-Knight and Overland cars.

Herbert H. Swiss, recently export sales manager of the Republic Truck Sales Corp., has been appointed foreign sales manager for the Ruggles Motor Truck Co., Saginaw, Mich., and Ruggles Motor Truck Co., Ltd., London, Ontario, Canada.

eign plants, with 5758 built in the Canadian plant.

Daily production of Fordson tractors during February will approximate 400. In January the River Rouge plant built 7904 tractors, while a year ago in that month there was little if any activity.

OAKLAND AT NEW ORLEANS

NEW ORLEANS, Feb. 24—The Oakland automobile has come back to New Orleans. The Cucullu Motor Car Co. last week announced that the contract for Oakland had been signed and that the first carload of cars is on the way. The Oakland has not been represented in New Orleans for more than a year. The Cucullu company already is distributor for Haynes and Columbia cars.

Durant Buys Glass Plant to Supply Car Requirements

Will Control 6,000,000 Square Feet Annually From the American Plate Glass Co.

NEW YORK, Feb. 24—Declaring that the production of automobiles this year will be regulated by the ability of glass manufacturers to produce plate glass in sufficient quantities to meet the requirements of motor car manufacturers, W. C. Durant announced that on Dec. 20, 1922, he had purchased the entire capital stock of the American Plate Glass Co., located at Kane, Pa.

"Its buildings, furnaces and equipment are in excellent condition and its capacity is between 5,000,000 and 6,000,000 square feet of plate glass a year—sufficient to meet all the requirements of Durant enterprises for some time to come," says the announcement, which is contained in a special issue of the "Durant Partner," official organ of Durant Motors. "Its relationship with Durant automobile body builders will be similar to that existing between the National Plate Glass Co. and the Fisher Body Corp., which the latter owns and controls.

"The American Plate Glass Co. will be independently financed and the 249,000 partners in Durant enterprises will be given an opportunity to invest in and participate in the splendid profits to be derived from existing and future business."

According to statisticians, three concerns—Fisher Body Corp., Ford Motor Co. and Durant Motors—control one-third of the country's total plate glass production. It is estimated that this production is about 120,000,000 square feet a year, of which Fisher controls between 25,000,000 and 30,000,000 square feet, Ford in the neighborhood of 7,000,000 and Durant about 6,000,000.

This same extra issue of the "Durant Partner" also touches upon the corporation's financial success, it being stated that Durant Motors, Inc., surplus for the year ending Dec. 31, 1922, has been increased over \$20,000,000 and that the book value of the stock as of that date was approximately \$53 a share. It also stated that on Feb. 10 the price of Star stock advanced to \$24 a share.

PACKARD RACE DRIVERS

INDIANAPOLIS, Feb. 24—Following the filing of the entries of three Packards for the Indianapolis 500-mile race, Col. Jesse G. Vincent announces that two of his drivers will be Ralph De Palma and Joe Boyer. The former has had charge of the construction of the racing cars and his nomination was expected. Boyer, however, comes as a surprise. Boyer is no stranger in the racing world, having been one of the Duesenberg team that raced in the French Grand Prix two years ago, when Murphy won. He long has been noted for his daring, and his selection is regarded as a good one.

Ford Schedule Is 129,000 Cars and Trucks This Month

DETROIT, Feb. 23—Ford Motor Co.'s schedule of 129,000 cars in February will mean a production of about 5400 daily in the twenty-four working days that the month affords. The highest daily mark the company has ever made was 5699 in August last year, which gives an idea of the extent of the business which the company has to meet at a time when what had formerly been considered the selling season has not started.

Total production in January was 119,513 cars and trucks, by far the largest mid-winter month's mark the company has ever reached. Of this total, 8368 cars and trucks were built in the for-

IN THE RETAIL FIELD

The B. D. Rickey Motor Co., Steubenville, O., has been incorporated with a capital of \$50,000. The purpose will be to operate a general automobile and garage business.

H. C. Edwards & Co. of Dayton, O., has been incorporated with a capital of \$25,000 by H. C. Edwards, J. B. Coolidge, Daniel L. Dwyer, B. D. Moore and Jeanette Rench, to do a general automobile and accessory business.

The Bedford Auto Sales Co. of Bedford Village, O., has been chartered with a capital of \$10,000 to buy, sell and exchange automobiles, trucks and tractors.

A new Chevrolet sales and service building has been opened by the Voice Motor Co. at 4620-4622 North Broad street, Philadelphia. A. B. Voice is president.

Edward W. Burnshaw, Jr., for many years general manager and treasurer of the Girard Automobile Co., and later associated with the Sweeten Automobile Co., has formed the Burnshaw Motor Co., as an authorized dealer in Ford and Lincoln cars at 2037 Market street, Philadelphia. Associated with him is Charles B. Prettyman, Jr.

The Tracey Motor Corp., Geneseo, Ill., has opened a garage and sales agency in the newly completed Weimer building.

The S. E. Lewis Motor Sales Co., has been organized at Marion, Ill., and will shortly open a garage and sales agency at 202 East Main street. Capital stock has been fixed at \$100,000. The incorporators include S. E. Lewis and R. A. Roberts.

Plans have been approved for the erection of a building for an extensive battery and service business for W. D. Shellabargers Sons Co., corner of Franklin and William streets, Decatur, Ill. The structure will cost \$15,000.

Automobile dealers of Henry, Bureau and Stark counties, Illinois, combined in exhibits at a successful display of motor cars at Kewanee, on Feb. 9 and 10. Merchants cooperated by giving a style show with living models, wearing the latest gowns and wraps. Vaudeville entertainers also were an attraction.

The Miller Auto Supply Co. is a new accessory concern in Birmingham, Ala. D. D. Bentley will be in charge of the company.

Harrington Motor Co., 119 Railroad avenue, East Aberdeen, S. Dak., has been established as a subdivision of the Harrington Motor Co. of

Minneapolis. The new company will distribute the Hupmobile exclusively in northern South Dakota and southern North Dakota.

Henry A. Mason and Paul D. Stroud have formed a partnership at Atlanta, Ill., and have opened the General Motors garage at that point. The firm will distribute the Buick and Chevrolet cars and also do a general repair storage and service business, carrying a complete line of accessories.

The Mudd Motor Co. has been organized at Stronghurst, Ill., with capital stock of \$10,000. The promoters include Roy Mudd, J. L. Edwards, and George S. Tracey. The new firm will distribute motor cars and handle accessories and also do a general repair and storage business.

The Palestine Motor Car Co. has been organized at Palestine, Ill. Capital stock has been fixed at \$50,000. A garage and sales agency will be opened at 405 Main street. The promoters include C. C. Herning, John Phipps, and Roy Nelson. It is planned to do a general repair and storage business and also carry a line of accessories.

The Auburn garage at 1128 Auburn street, Rockford, Ill., has been opened by Clyde Glenn and Gilbert C. Brown. The structure has a frontage of 58 feet and a depth of 148.

Valley Motor Car Co. of Appleton, Wis., has been acquired by the Valley Automobile Co. of Appleton, which will operate it as a sales and service station for Studebaker automobiles in the same quarters at 726 College avenue.

The Park Garage, Suffield Conn., conducted by Edward Chase and Geo. B. Jones, was totally destroyed by fire Feb. 16, together with fourteen cars. The building was used for sales, maintenance and storage. Loss is estimated at \$50,000, partially insured.

Quinlan Motors Co., Chicago wholesale dealers in Moon cars through Michigan, Indiana, Illinois, Wisconsin, Iowa and Missouri, announce that Kalamazoo has been made headquarters for distribution in Michigan. H. S. Lowe, district sales manager, has been placed in charge of the state and will have his offices in this city.

The Elcar Motor Sales Co. of Cleveland, has been incorporated with a capital of \$25,000 to buy and sell new and used cars.

The Upco Mfg. and Sales Co. of Cincinnati, has been chartered with a capital of \$10,000 to deal in automobile accessories.

Illinois Dealers Working For Change in Garage Record Law

State Convention to Be Held March 19 at Quincy—Officers Nominated

CHICAGO, Feb. 23—Nomination of officers of the Illinois Automotive Trade Association for 1923 has been announced by the nominating committee in advance of the state convention of the association to be held March 19 at Quincy. Only one ticket was nominated and it is expected to be approved by vote of the membership at the convention.

The nominations follow: President, Paul J. Killeen, Galesburg; first vice president, R. C. Cook, Chicago; second vice president, Morris Adler, Quincy; third vice president George Kelsall, Joliet; fourth vice president, C. R. Constant, Springfield; treasurer, H. B. Pinkerton, Peoria.

The convention will be in session only one day so that by traveling at night members who attend will be away from their business only one day. Chicago, Peoria, Galesburg, Monmouth, Kewanee and other cities are arranging for special cars to carry their members to the convention.

The legislative committee of the association is preparing a draft of a bill which will either ask for the outright repeal or an amendment to the Illinois law requiring that all public garages in the state keep a record open for public inspection of the license and engine numbers of all cars taken into the garage. The intricacy of this law is to make it irksome and virtually impossible to comply with. To assist it in preparation of a new measure the legislative committee has sent a questionnaire to all garages and dealers asking for data as to capacity, number of customers daily, transient and permanent; average storage periods, and number of times records were inspected by state or city officials in 1922.

CADILLAC SALES INCREASE

DETROIT, Feb. 22—Sales of Cadillac cars in January set a new mark for that month and indications are that February will show a greater percentage of gain over any preceding February. Distributors are ordering heavily in anticipation of spring demand, and indications are that all sections of the country will share in this business. Show attendance is not only heavy in all districts, but the attitude of those attending is defined as highly encouraging for sales this year.

CROSSLAND LOOKS FOR FACTORY

ROCKFORD, Ill., Feb. 24—William Kenyon, former district manager of the Stewart Motor Truck Co., now associated with the creators of the Crossland steam car, conferred with local manufacturers this week to discuss tentative plans for location of the Crossland factory in this city.

Boston Police Arrest Two Swindlers of Accessory Houses

BOSTON, Feb. 24—The Boston police arrested two men here this week named Morrison and Darling, who have been working a clever confidence game swindling automobile accessory houses.

One of the men would go into an accessory house and inquire for a certain type of spark plug, saying he would take 1,000 or more if he could get them. Some days later the other would go in and ask the proprietor if he wanted to buy some plugs of this particular make. As the first man left his name and address, and an order for the plugs, the accessory man, seeing a possible chance to make a quick sale, would buy some and pay a deposit for quick delivery. He would never hear from it. After several accessory men had been swindled the police were notified and the arrests followed. It turned out that the plugs were some used in France for aviation and were metric size. Morrison and Darling claimed to have received 300,000 shipped in from France. They have been held for the grand jury.

SHOW EXHIBITS CHANGED

SPRINGFIELD, O., Feb. 22—Springfield's ninth annual automobile show

opened under auspicious circumstances Monday night in Memorial Hall. The large auditorium was attractively decorated. During the evening hundreds of persons visited the show. Dealers say that they expect to reap excellent results from the exhibition, which will continue all week.

So that a complete display of the cars handled by the dealers may be made, the first three days have been set aside for the display of open models. The last three days of the week only enclosed models will be shown.

BARLEY SEDAN IS SHOWN

KALAMAZOO, Mich., Feb. 22—The Barley Motor Car Co. of this city put on display during show week the first model yet shown of their new Barley touring sedan. It is a car designed to sell at \$1,685, f. o. b. factory, being mounted on a standard Barley chassis, while the interior trim is leather for the front seat and velour for the tonneau. There are three heavy plate glass panels on each side the four front ones being designed to be removed and stored in a carriage pocket just back of the front seat, thus converting the car into an open model. The rear windows raise and lower.

The READERS' CLEARING HOUSE

Questions & Answers on Dealers' Problems

Preparing Storage Batteries For Dry Storage

Q—What is the correct procedure to follow in preparing storage batteries for dry storage?

1—First charge the battery. Then pour out the electrolyte and separate the groups. If the negatives have bulged, press the material back into place with a plate press. In batteries in which it is difficult to remove the plate from the cover, the groups need not be separated unless the negatives have badly bulged active material. It may not be necessary to separate the groups even then, provided that the positives are not buckled to any noticeable extent. If only a very slight amount of buckling exists, the entire element may be pressed by putting thin boards between the plates in place of the separators.

Immerse the negatives in distilled water for 10 to 12 hours. If positive and negatives cannot be separated, wash each complete element in a gentle stream of water. Remove plates from water and allow them to drain thoroughly and dry. The negatives will heat up when exposed to the air, and when they do so they should be immersed in the water again to cool them. Repeat this as long as they tend to heat up. Then allow them to dry thoroughly.

Throw away the old separators. Rubber separators may be saved if in good condition. Clean the covers and terminals, wash out the jar, and turn the case upside down to drain out the water. Examine the box carefully. It is advisable to wash with a solution of baking soda, rinsing with water in order to neutralize as far as possible the action of acid remaining on the box.

When the plates are perfectly dry, heat the positive and negative together, using dry cardboard instead of separators, and replace them in the jars in their proper position. Replace the covers and vent plugs, but of course do not use any sealing compound on them. Tie the terminals and connectors to the handle on the case with a wire. Tag the battery with the owner's name and address and on the same tag make a sketch of the arrangement of terminals and top connections so that when battery is rebuilt it will be made up properly to suit the wiring on the car. Store the battery in a dry place, free from dust, until called for.

When the battery is to be put into service again put in new separators, put the elements in the jars, seal the covers,

The Readers' Clearing House

THIS department is conducted to assist dealers and maintenance station executives in the solution of their problems.

All questions are answered direct by letter, so the name and address should be given in full. This saves waiting for the answer to be published, which sometimes occurs several weeks late, depending upon the space available.

Readers' names will not be published with articles, if a request to this effect is received with the letter.

Inquiries not of general interest will be answered by personal letter only. Emergency questions will be replied to by letter or telegram.

Also state whether a permanent file of MOTOR AGE is kept, for many times inquiries of an identical nature have been made and these are answered by reference to previous issues.

Addresses of business firms will not be published in this department but will be supplied by letter.

Technical questions answered by B. M. Ikert, P. L. Dumas and A. H. Packer; Legal, by Wellington Gustin; Paint, by G. King Franklin; Architectural, by Tom Wilder; Tires, by a Practical Tire Man; General Business questions, by MOTOR AGE organization in conference.

and burn on the top connectors and terminals, if these are of the burn-on type. Fill the cells with electrolyte of about 1.310 specific gravity and allow the battery to stand from 10 to 12 hours in order to cool. Then put the battery on charge at one-half the normal charging rate and charge until the specific gravity of the electrolyte stops rising and remains stationary for five hours. The total time required for this development charge will be about four days. Watch the temperature of the electrolyte carefully and if it rises to 110 Fahr., stop the charge until it cools.

The specific gravity will fall during the first part of the charge due to the fact that the new separators are absorbing the acid; at the end of the charge the specific gravity should be from 1280 to 1300. If it is not within these limits adjust it by adding electrolyte or water, depending on whether the gravity is low or high. Clean the case thoroughly and

give it a coat of asphaltum paint. Give the battery a high rate discharge test before putting into service.

2—Is it detrimental to the dry stored plates if they are kept in a place where the temperature is below zero?—George Toews, care Toews Bros., St. Pierre, Minn.

2—No harm will result if the plates have been thoroughly dried in accordance with the above instructions. Note—The above instructions were taken from a book entitled "The Automobile Storage Battery," by O. A. Witte, published by the American Bureau of Engineering, Chicago, Ill.

TRUCK ITSELF IS LIABLE FOR CHARGES

When we leased our place we found an old truck on the lot and in our way. Before disposing of it we made inquiries regarding its ownership and uncovered the following information:

A man placed a car for sale with a used car dealer, at that time on our location. The dealer told him he could trade his car for a truck and sell the truck easier, and the owner evidently agreed to this. When he saw the truck, however, he refused to take the bill of sale made out to him; left the truck on the lot and started suit for the return of his car.

Meanwhile, the truck is on our lot and he refuses to pay storage or remove it. Our bill now amounts to \$10.50. The truck is not worth \$20 in junk. May we sell the truck for storage? If not, how may we force its removal from the lot?—Auto Maintenance Co., Seattle, Wash.

The court will decide whose truck you now have, but in the meantime you may proceed against the truck itself, giving notice to both parties, then selling the same. Under section 1193 of Remington's Compiled Statutes of Washington, you are required to give ten days' notice of the proposed sale.

The moneys arising from the sale shall first be applied to the payment of the costs and expenses of the sale, and then to the payment of the lawful charges of your lien. Any surplus shall be retained subject to the demand of the owner of the property, who shall have paid such charges or otherwise satisfied such lien, and all moneys remaining uncalled for, after three months shall be paid to the County Treasurer, who shall preserve same for the benefit of the lawful claimant thereof.

The notice required to be given is the same as that provided in cases of sales of personal property upon execution.

The difficulties of the litigants mentioned by you do not concern you or your right to collect what is due you.

Architectural Service

IN giving architectural advice, **MOTOR AGE** aims to assist its readers in their problems of planning, building and equipping, maintenance stations, garages, dealers' establishments, shops, filling stations, and, in fact, any building necessary to automotive activity.

When making request for assistance, please see that we have all the data necessary to an intelligent handling of the job. Among other things, we need such information as follows:

Rough pencil sketch showing size and shape of plot and its relation to streets and alleys.

What departments are to be operated and how

large it is expected to be.

Number of cars on the sales floor.

Number of cars it is expected to garage.

Number of men employed in repair shop.

How much of an accessory department is anticipated.

Look Ahead Before Starting to Build

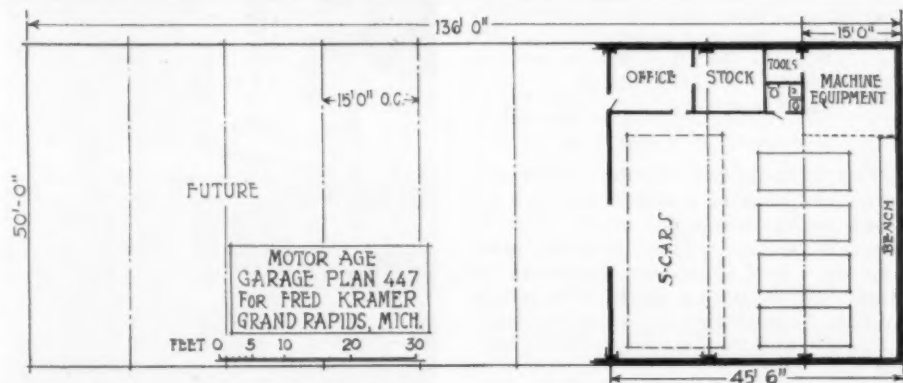
Q—I am enclosing a rough sketch of a building I am contemplating building and wish you would send me a plan for same. You will notice small house located in one corner. This I wish to retain for the present, as it reduces overhead.

I intend to use a general repair shop, no washing or storage of cars outside those being worked upon. A stock of Ford parts, oil, greases and tires will be handled. No women will be employed, so no extra lavatory will be necessary. I intended to make front of building temporary so it could be moved forward and garage enlarged.

Would you advise cement block or tile construction for permanent part of building?—Fred Kramer, Grand Rapids, Mich.

We think you have exactly the right idea, but suggest that you look ahead to the time the building will be completed, so that you will not do something that will have to be done over some other way a year or two hence.

You will eventually have a building 50x136 ft. This will need a trussed roof and the best spacing for the trusses will



be 15 ft. on centers. With this in view, it would be better to make your first section 45 ft. deep, which would consist of three complete bays of the finished building. There would be the added advantage of having space for another row of cars without crowding those being worked on.

Regarding the values of cement blocks and hollow tile, either is good building material if of good quality. The tile is usually very absorbent and must be kept

up off the ground or the frost will cause it to scale off and gradually waste away; there are, however, vitreous kinds that resist frost as well as brick. The absorbent qualities are perfectly good except under ground or where they will become water soaked.

Couldn't you get more income out of storage space in a larger garage than the house will yield? One 10 ft., or even an 8-ft. door, should be sufficient for this shop.

FILLING SCORED CYLINDERS

Q—We have some questions to ask in regard to a model E-44-1918 Buick six cylinder car. The cylinder block in this car is scored quite deeply, due to a loose wrist pin. How much can be taken from the cylinder wall by regrinding or re-boring and still have the block safe to use?

1—Scoring of cylinders produced by a loose wrist pin usually looks deeper than it really is, as a score approximately .018 in. deep may look to be 1/16 in. deep. We would say, however, that it is safe to remove 1/16 in. of metal if necessary or in other words to enlarge the diameter of the bore 1/4 in. If this is done, however, it should be done the same amount in all cylinders.

If the cylinders are in comparatively good shape outside of this one score, we believe that it would be best to fill this up rather than regrinding and in this connection would suggest your getting in touch with the Pence Automobile Co., Minneapolis, Minn., as these people are the Buick dealers in your territory. They can, no doubt, take care of having the score fixed up. When you come to rebuild the engine again, it would be well to use the Dalton Balch special type set screw in the piston for locking the wrist pin.

Trouble with the use of the cotterspines which are standard equipment on this model is that the bearing of the wrist pin in the upper end of the connecting rod is often made too tight by repairmen. Then when the engine is run the bearing turns with such difficulty that the wrist pins are turned in the pistons

and the cotterspines are sheared off. Then when the wrist pin loosens up a bit it may slide sideways in the piston and score the cylinder. If you are shipping the cylinder block it might also be well to ship the pistons and rods and have them fixed up with this new type of set screw. If on the other hand you care to, you can do the work yourself by tapping out the cotterspines in the piston bosses.

2—Would a cylinder block from a model K-1920 Buick car fit on this model E-44 without too much extra work?

2—While it is a physical possibility to install the block as suggested in your question, we do not believe it would be advisable, as you get into a great deal of difficulty in connection with the valve mechanism. The reconditioning of the old cylinder block would be the best way of handling the problem.

3—Outline best method to use in removing engine from the car.

3—This can be done by disconnecting the engine from the transmission and in this manner it is not necessary to remove the steering column. The transmission is disconnected by removing ten nuts. The clutch pedal is disconnected and the bolts removed from the motor leg. The front end trunion is also disconnected and the motor can then be slid forward about 4 in. This is enough to bring it up to the steering column and to slide the clutch shaft out of the transmission. It will then be possible to twist the motor sideways and lift it out of the chassis.

4—What is the best way of relining the clutch?—John L. Fox, Albert Lea, Minn.

4—The safest rule to follow is to replace not merely the clutch leather but the clutch cone as well, installing one on which the leather is all put in place. This operation is very simple, as it merely means removing three nuts, taking the old cone off and putting the new one on.

VALVE AND IGNITION TIMING OF 1920 CHANDLER

Q—Give us the correct valve and ignition timing for a 1920 Chandler in inches on the flywheel.—Samuel B. Hoover, Philadelphia, Pa.

The valve timing is as follows: Intake opens 16 degs. after top dead center and closes 36 degs. after bottom dead center. Exhaust opens 46 degs. before bottom dead center and closes 9 degs. after top dead center. To change these figures into inches on the flywheel it is necessary to use a tape line and measure the circumference or distance around the flywheel. Then divide this number of inches by 360. For a 16 inch flywheel this gives .138 inches, equals 1 deg.

For example, the intake opening distance would be 16 times .138 or approximately 2.2 inches or we would say, 2 1/4 inches after dead center. The other figures in degrees could be similarly changed. The ignition timing should be such that with the spark lever in the retard position the interrupter points should just barely begin to open 1 inch past top dead center measured on the flywheel. This will be approximately when the piston has gone 1/64 inch down from its topmost position.

Evinrude Engine to Drive Generator

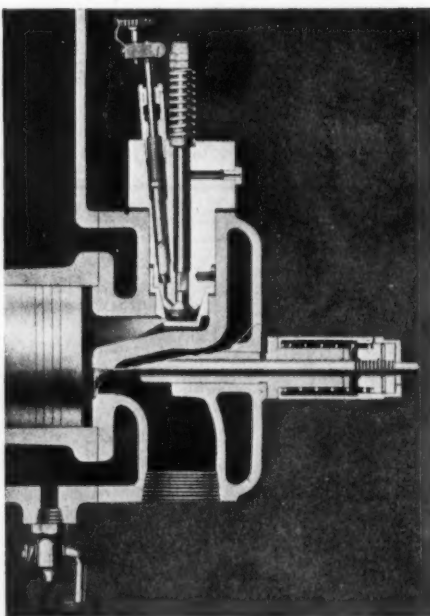
Q—We are contemplating using an Evinrude oil type engine $1\frac{1}{2}$ hp. model F.A. for driving an electric generator and would like to know your opinion as to whether it would prove satisfactory or not. It is a low speed stationary injection type. No carbureter, ignition or compression in the crankcase is used, as it is a four-cycle type engine. It uses anything from kerosene to crude oil for fuel. This engine is made in Milwaukee, Wis.—Rex Spatz, Meckling, S. D.

Two illustrations of this engine are given, one showing a section through the whole engine while the other shows an enlarged section of the cylinder head. The latter view illustrates the manner in which air is drawn in at the bottom opening by means of one valve and indicates the way the fuel is drawn in from the top.

This engine is of a type known as the "bomb type," due to its peculiar and ingenious method of introducing the fuel into the combustion chamber proper by means of a primary explosion. The compartment in which this primary explosion takes place we term the fuel cup. Its volume compared to that of the cylinder displacement is very small. The engine is of the four-cycle type and the operation of the cycle is as follows:

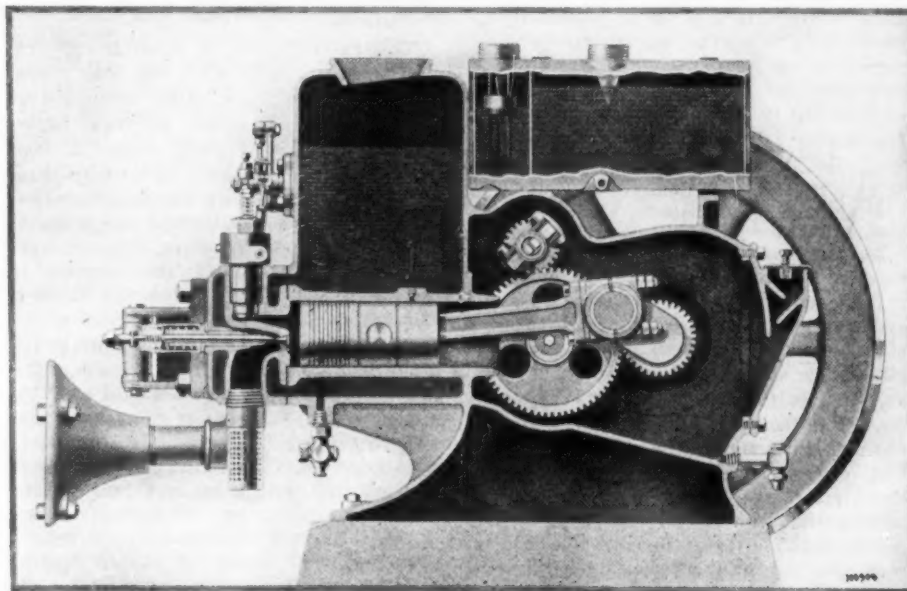
No. 1—Beginning with the intake or suction stroke, a charge of fresh, pure air only is taken into the cylinder. The fuel cup is in direct communication with the combustion chamber proper, by means of small ports or holes, and, under the influences of the vacuum, draws in a charge of oil which spreads as a thin sheet or film of oil over the bottom of the cup.

No. 2—At the end of the intake or suction stroke, the air inlet valve, as well as the fuel valves controlling the inlet of oil, are closed. The piston then proceeds back on its second or compression



Cylinder head showing air and fuel inlet on Evinrude power machine

stroke. As the fuel cup is in direct communication with the combustion chamber proper, the compressed air in the cylinder is forced into the fuel cup also, causing thereby its violent, turbulent action, and aided by the heat generated by the compression, the generation of a combustible gas mixture, particularly of the lighter hydrocarbon constituents of the fuel. As the compression increases, the point is finally reached where the generated heat is sufficient to cause auto-ignition in the fuel cup, and an explosion in this cup follows, reverting the air stream and forcing the oil, which as yet remains in a liquid state, and also the gas, into the combustion chamber, where the final combustion proper now takes place.



Sectional view Evinrude power machine

No. 3—The combustion completed, the piston is driven forward on its power stroke by the force of the expanding gases.

No. 4—At the end of the power or expansion stroke the exhaust valve opens, and, as the piston returns on the exhaust stroke, the burnt and expanded gases are forced out of the cylinder, thus completing the cycle, which is repeated over and over again.

While we have no definite information as to the service rendered by this engine, it would appear to be satisfactory for your purpose. It is built in two sizes, $1\frac{1}{2}$ and 3 hp., selling at \$125 and \$175, respectively, and is built by the Evinrude Motor Co., Milwaukee, Wis.

TIMING ON JORDAN MODEL F 1919

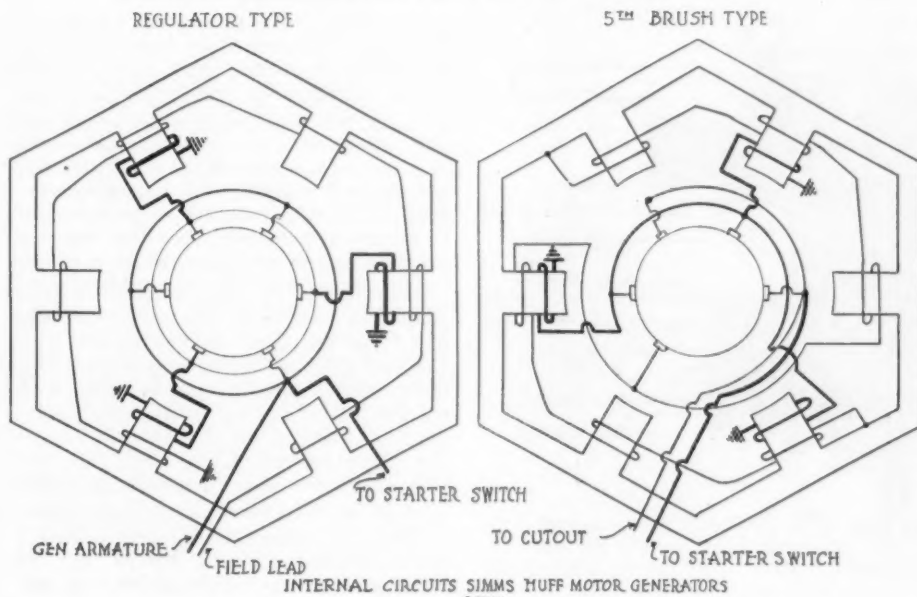
Q—Give us the valve timing, ignition timing, breaker point opening and clearance between valve stems and push rods on a Jordan model F, 1919, with a Continental 9N motor.—A Reader.

The valve timing is as follows: Intake opens 10 degs. after top dead center and closes 28 degs. after bottom dead center. Exhaust opens 40 degs. before bottom dead center and closes $2\frac{1}{2}$ degs. after top dead center. If you wish to change these figures in degrees into inches on the flywheel, you can do so as follows: Measure the distance around the flywheel with a tape line. Take this measurement in inches. Then divide this number of inches by 360, for there are 360 degs. in a circle. This will give you the number of inches on the flywheel corresponding to 1 degree. Then multiply this number of inches by the number of degs. given and you will have the inches on the flywheel for the different valve action.

Suppose, for example, that in measuring around the flywheel you find it 50 inches. We then divide 50 by 360 and the answer is about .138 inches, which is the equivalent of 1 deg. The opening of the intake valve, for example, would then be 10 times .138, or 1.38 inches, or approximately $1\frac{3}{8}$ inches after dead center. In similar manner you can check the other valve action. The valve stem clearance should be .003 inches when the engine is hot and this can be checked with a feeler gage which should just barely slide between the valve stem and the push rod without binding seriously and without going through easily.

The ignition timing should be such that with the spark lever in the retard position and the flywheel $1\frac{1}{4}$ inches past dead center that the interrupter points are just ready to open. The opening of the interrupter points produces the spark and with this spark in the retard position occurring $1\frac{1}{4}$ inches past dead center, there will be no chance of the engine kicking back. Before the timing is set, the ignition contacts should be set to have an opening from .018 to .020 inches.

Simms-Huff Generator Circuits



Q—We recently received a Maxwell Simms-Huff generator which has five brushes on the commutator. This motor generator had been taken apart and the brush leads were improperly connected. We have had considerable literature and wiring diagrams but so far have not had one showing the internal circuits of this five-brush machine. We would like to have a diagram showing the internal con-

nections, as we are unable to figure out where the various wires go.—McArthur & Hinckley, Blythe, Calif.

We are illustrating both the five brush type of Simms-Huff motor generator and the six brush type which use a regulator as well. The internal connections should be evident from these illustrations.

GENERATOR GETS HOT

Q—We have a Willys-Knight car, model 89-6, equipped with Auto-Lite, two brush generator. The armature in this machine burned up and we had it re-wound. The charging rate before the armature burned up was 12 amperes. When the armature was replaced in the generator we found that it had a commutator somewhat larger than the old one, which brought the brushes to within $\frac{1}{8}$ in. of the frame.

Equipped with this armature the generator charges 15 to 17 amperes, but we find that it gets very hot after a run of about 30 miles. When speeding the car up to 35 or 40 miles an hour, the generator continues to increase the output and will not cut out properly. How is the charging rate reduced on this type generator. We have weakened the brush springs as much as possible as we have them set in the last notch.

1—The only possibility would seem to be that the armature is not correctly wound, which would possibly be indicated by the oversize commutator. When you say that the generator does not cut out, we assume that you refer to the characteristic of third brush machines, which causes them to reduce the charging current to battery at high engine speeds.

The generator in question, however, has regulation by means of a reverse series winding and the current will continue to increase a certain amount with increased car speed and never drops at high speeds. There is no method of changing the charging rate on this machine and the only right method would be to install the correct type armature.

It would probably be possible, however, to cut open the connection between the two shunt field coils and bring out these leads connecting a resistance in series with them. This could be made of iron or german silver wire and a certain amount of experiment would be required to get proper results.

This is an emergency method, however, and the correct repair would seem to be the use of the proper armature. We do not believe that reduction of the brush spring pressure should be depended on to cut down the current as, while it may do so to a certain extent, it will tend to cause sparking at the commutator which will rapidly destroy brushes as well as the commutator itself.

2—What is wrong with the Auto-Lite generator on an Overland 4 that will not cause the cutout points to close until after the car has been driven a mile or two. When starting up, however, if the cutout points are closed by hand the ammeter will show charge.—R. L. Wilhelm, Athol, S. D.

2—The most likely cause of this condition is excess oiling, which allows oil to get onto the commutator and soak into the brushes. Even if the commutator and brushes are sandpapered and the operation improves temporarily, the trouble will return, as the oil works out of the brushes and forms an insulating glaze on the part of the brush that rubs on the commutator.

The remedy is the use of new brushes, even if the old ones appear to be O. K.

The reason for the trouble is that, with a slight insulating film on the brushes, the small voltage generated in the armature cannot send any current through the shunt field winding so that the generator does not build up. However, when you close the cutout points and feed battery current to the generator field it causes the armature to generate six volts instead of perhaps .5 volts and after it has once started, the armature voltage can send current in spite of this slight insulating film.

While oily brushes constitute the most likely cause, it is also possible, of course, that there is poor connection at some other point in the field circuit and if new brushes fail to cure the condition, it would be well to check the connections in the shunt field. The reason that the generator will charge after the car has driven awhile, is that the friction of the commutator on the brushes rubs off the layer of congealed oil, or else it heats it up to the point where the current can get through.

NOTES ON BODY PAINTING

Q—We recently have undertaken to paint a Dodge car. The result has not been very satisfactory and there are little specks sticking above the gloss. When we rub them down, it naturally takes the gloss. We have stained same, but results seem to be the same. We used enamel for the job.

1—Specks in the finish might be pigment in the varnish that has not been properly broken up, or just ordinary plain dirt. If the first, your trouble can be avoided by proper mixing; if the second, and you do not understand clean finishing, we advise you not to try it without first learning the work.

2—Do Dodge Bros. use different paint; if so, where can we get same?

2—The material that is used by Dodge Brothers in their baked-on finishes is not to be used by the job shop not equipped for baking, because it requires a heat of from 275 to 400 degrees.

3—What temperature is metal and paint at dipping?

3—In dipping, the temperature of metal and paint should be at room temperature—70 to 80 degrees in winter.

4—What sort of treatment stands the weather best?

4—Baked-on finishes are more durable than the air-dry.

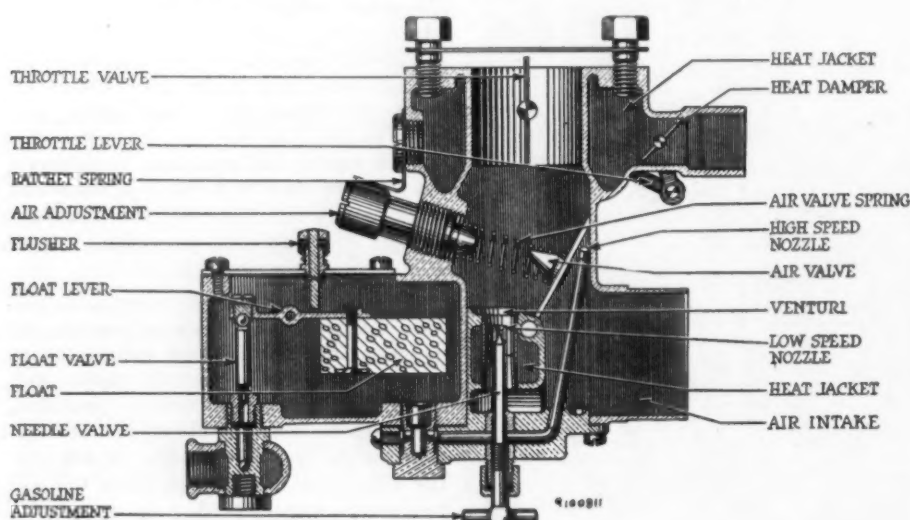
5—Would a good grade of outside varnish stand the weather; if so, how applied?

5—A good grade of automobile finishing varnish will stand the weather as long as it possesses life. To apply it, we refer you to the advice above.

6—Do Dodge Bros. use a filler on the metal before painting; if so, what and how applied.—Hillside Garage, Ashland, Wis.

6—They use filler coats, but this material is not the same kind of filler used in air-dry work. These baked-on materials can be used only in conjunction with ovens.

Overland Carburetion and Wiring



Marvel carburetor

Q—Answer the following questions in regard to an Overland Model 83 on which we are working. This car has a Marvel carburetor which we think must be special equipment as we cannot find any record of its being used on Overlands. Give a few pointers in regard to the adjustment of this carburetor and publish diagram.

1—Diagram is shown in accordance with your request. The carburetor has two adjustments, one being the air adjustment, shown at the left, while the other is the gasoline adjustment, shown at the bottom. To start with, the air adjustment is turned in until the end of the screw is flushed with the point of the ratchet spring just above it. The gasoline adjustment is turned in until it does not turn any further and then is backed off or turned to the left one turn.

These preliminary adjustments will enable you to start the engine and it should then be run until the engine is hot. With the spark retarded, the gasoline adjustment should now be turned to the right so as to close the needle valve until the engine idles smoothly. The spark should now be advanced and the air adjustment screw turned to the left a little at a time until the motor begins to slow down or skip, indicating too much air. It should then be turned to the right again until the engine runs smoothly.

To see that the adjustment is correct after proceeding as above indicated, advance the spark lever and open the throttle quickly. The engine should accelerate instantly without skipping or popping back. If it does miss or pop back, open the gasoline adjustment slightly by turning the needle valve to the left. Do not touch the air adjustment again unless absolutely necessary.

2—Publish diagram of the Overland Model 83.

2—Wiring diagram is shown in accordance with your request.

3—What is the firing order and the timing?

3—Firing order is 1-3-4-2 and the spark should occur on dead center or when the piston has gone down about 1/64 in., with spark lever retarded.

4—Give valve timing and valve clearance.

4—Intake opens 8 degs. after top dead center and closes 38 degs. after bottom dead center. Exhaust opens 45 degs. before bottom dead center and closes 15 degs. after top dead center. Valve stem clearance is .012 in. for both inlet and exhaust valves.

6—Publish diagram of Overland clutch and state how to remove the clutch spring stud plate from the crankshaft.

5—No diagram is available, however, the process of removing the clutch is rather simple. The axle may need to be moved back a bit to make clutch accessible. This makes possible removal of the short spacer shaft. You can then pull the clutch back and take it out and the process of dissembling should be perfectly simple to any good mechanic.

6—Can a spark advance be put on an American Bosch high tension magneto and if so advise how this is done?

6—On magnetos having a set spark it will be found that there is a notch cut

in the interrupter housing which goes over a screw in the magneto so that the interrupter housing cannot be turned. In order to make the spark adjustable so that it can be advanced at high speed it is necessary to take out this screw and put it in another screw hole. There are two marks, one is C and the other is A, the first standing for clockwise and the second standing for anti-clockwise. The direction of rotation above indicated is always considered from the coupling or drive end of the magneto.

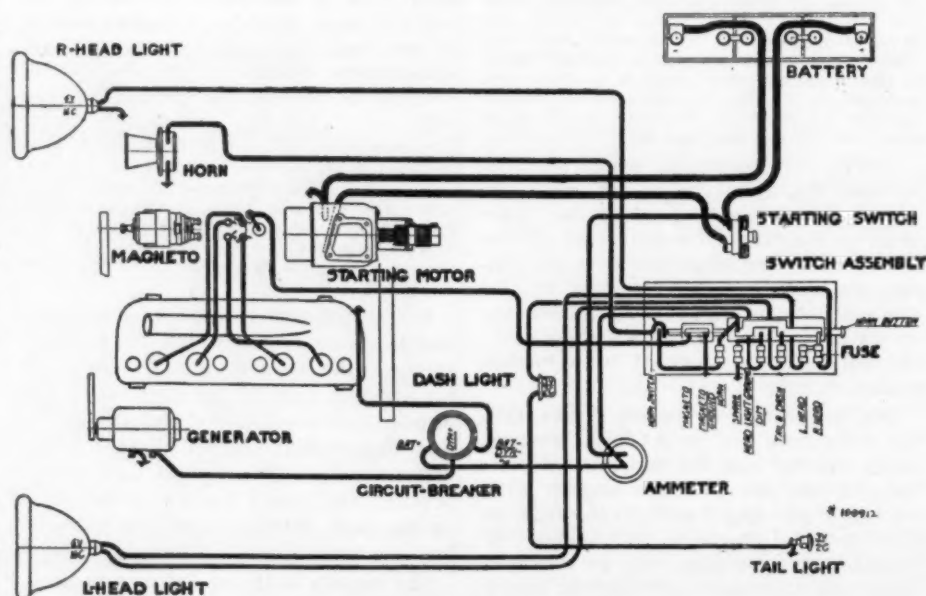
Accordingly, if the magneto rotates clockwise, you take this screw out and put it in the hole marked C and if it rotates to the left, or anti-clockwise from the coupling end, you put it in the hole marked A. At the side of the interrupter housing away from the small notch is a much larger notch, and when this goes over the screw head it allows a certain amount of movement to the interrupter housing. If the housing does not have a spark advance arm on it you can get one from any authorized Bosch service station. If there is none in your town you can write to the American Bosch Magneto Corp., 3737 South Michigan Ave., Chicago.

7—Give methods of locating knocks in engines?

7—This is a big question. The ability to accurately diagnose engine trouble comes only with long experience. There are, however, a number of indications that in general help to locate knocks. A light tinkling sound or pinking indicates carbon knock or piston slap. A heavy, dull thump usually indicates loose main bearings or a flywheel loose on the crankshaft. A connecting rod knock or wrist pin knock is a sound somewhat lighter than the main bearing or flywheel knock but heavier than the piston knock.

It often happens that when the engine is under heavy pull such a knock will not be noticed, but when the engine gets up to 25 or 30 m.p.h. and runs along a smooth road, so that there is no great

(Continued on next page)



Overland Model 83 wiring diagram

Chevrolet Rear Axle Adjustments

Q—How can we tell how many spacing washers to use on a Chevrolet 490 rear axle between the propeller shaft housing and the axle housing itself so as to get the proper meshing of the pinion and ring gear. How tightly should the pinion be meshed with the ring gear when installing new gears?

1—As a rule, no adjustment is needed as far as the ring gear is concerned if new bronze thrust bearing is installed at the time that the ring gear is put on. To determine the meshing of the pinion and ring gear it is well to assemble the propeller shaft housing with the left half of the rear axle, leaving the right half off temporarily. The prescribed backlash or clearance between the teeth .005 to .008, but it is rather difficult to measure this. However, if you are accustomed to working on cars you can assemble the axle in this way temporarily and feel of the pinion to see that it has just a slight amount of back lash.

If the pinion should mesh tightly, the axle would no doubt be noisy, and if very loose would tend to cause a jerk in the action of the car. By this method of temporary assembly you can determine the correct number of spacing washers to use in between the propeller shaft housing and the rear axle housing.

2—How should the two nuts on the propeller shaft be adjusted?

2—In the illustration given it will be seen that it is necessary to take out the pinion shaft bearing lock stud before the propeller shaft assembly with bearing and thrust bearing can be removed from the housing. Instruction in regard to the adjusting nut taken from a Chevrolet service manual is as follows:

Removing Drive Pinion

1—Remove the cotter pin which locks the adjusting nut.

2—Unscrew the adjusting nut so that there is $\frac{1}{8}$ inch clearance between the nut and thrust bearing. This is very important and must not be neglected.

3—Remove the cotter pin through the drive pinion nut and remove the nut by unscrewing.

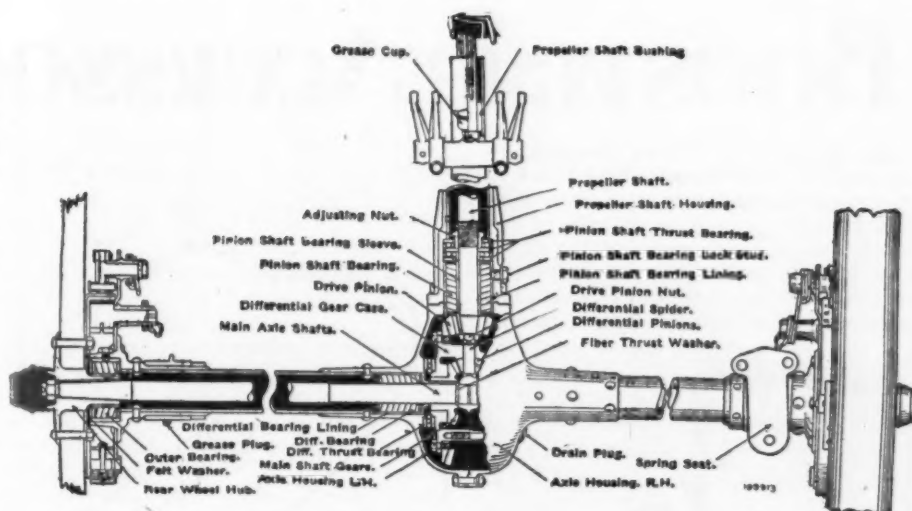
4—Place a block of soft wood on the

(Continued from preceding page)

pull on the engine, then a connecting rod or wright pin knock will be noticed. Connecting rod knocks can sometimes be detected by shorting out one spark plug at a time, as this tends to eliminate the noise while the plug is being shorted.

8—How is a bent connecting rod knock found?—Gerald F. Hoffman, Princeton, Ill.

8—The best way to find it is by testing the connecting rods on an aligning gage, many of which are being extensively advertised these days. If the connecting rod is bent so badly as to be pressing against the piston boss, it can sometimes be located by taking off the oil pan and looking up into the engine with the aid of a light while someone turns the engine over.



Chevrolet 490 rear axle

floor and, holding the shaft in a vertical position, let it drop so that the threaded end strikes on the block. This will usually be sufficient to loosen the drive pinion; however, should it stick it may be pried loose by slipping a bar between the back of the pinion and the bearing sleeve.

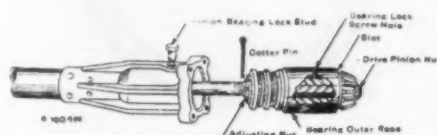
5—Slide the bearing off the shaft.

Instructions in regard to adjusting the thrust bearing may also be of interest. They are as follows:

Adjusting Thrust Bearing

1—On the end of the inner bearing race you will notice a slot. This should engage the end of the pinion gear.

2—Draw the adjusting nut up snug against the thrust bearing. Be careful



Chevrolet 490, method of removing propeller shaft

not to get it too tight; it must be free enough not to bind but should have no end play.

3—Insert and spread the cotter pin.

4—If this cannot be done without getting the bearings too loose or too tight, make a washer from sheet tin or brass and insert between the adjusting nut and the middle thrust bearing washer. Be sure that the cotter pin is inserted and spread.

Replacing Propeller Shaft Assembly in Housing

1—Stand the propeller shaft assembly in a vertical position, gear down, and slide the housing over the shaft.

2—At the upper end of the housing is located a bushing through which the shaft must pass.

3—Line up the bearing lock stud hole in the housing with the one in the outer bearing race. After the hole in the race

has disappeared into the housing, its location can be determined by the slot in the end of the race. Don't crowd the bearing and, above all, do not hammer on the end of the shaft. You are simply inviting trouble. It may loosen the pinion gear from the shaft or break one of the balls in the thrust bearing.

4—Insert and screw down tight the pinion bearing lock stud.

3—Advise the different things that govern the power and speed in a motor car?—A Wisconsin Subscriber.

3—This is a rather large sized question. If you knew all of these things accurately you would be the best designer in the world. A number of factors, however, are commonly recognized. They are bore and stroke, cylinder design, lightness of reciprocating parts, ignition, carburetion and vaporization. Lubrication and design that reduces friction also have a great bearing on the power and speed obtainable.

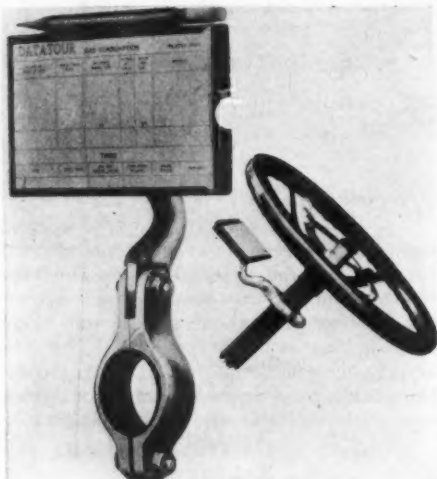
CLEANING MUFFLER ON LEXINGTON

Q—Advise as soon as possible how to clean out the muffler of a 1919 Lexington. We have the car here for repairs and the mufflers are clogged so that the car does not deliver the proper power. We are having the cylinders reground but do not know how to clean out the mufflers, there being two of these on the car.—Ralph Folker, Dayton, Ohio.

There is no way known of cleaning out these mufflers. The cost of a new one, however, is so slight, being only \$2.75, that it hardly pays to spend much time on them. It is possible, however, to drill additional holes in the muffler. Five rows of five holes each are drilled, these being $\frac{1}{4}$ inch in diameter. The drill is run all the way through the muffler, so as to put holes in all of the sleeves, there being three of these. After these twenty-five holes have been drilled all the way through the muffler, the ones in the outer shell are closed up by means of oxy-acetylene welding. When new mufflers are available, however, this job is hardly worth while. Clogged mufflers are often indicated by back pressure which tends to make the cut-out rattle.

BOOSTING ACCESSORY SALES

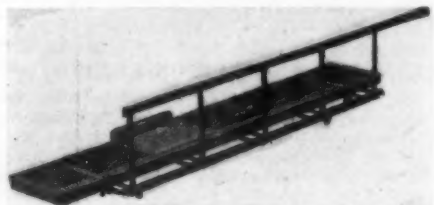
The Spring rush for new things offers the dealer a good opportunity to cash in on accessories and this year more than ever before, accessories will be in demand, that is good accessories will be. In selecting your stock of accessories for this year, buy those things which you think will be needed most by your cus-



The Datatour

tomers and don't get "caught" with a lot of worthless stuff simply because you could buy it "cheap."

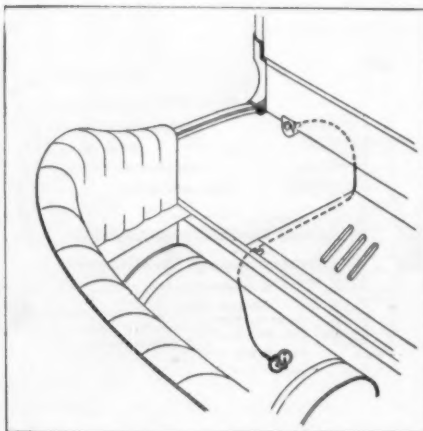
The Datatour is shown in the cut on this page and its many uses are at once visible. It attaches to the steering gear and is set on a hinged joint so that it may be turned down for protection against wind and rain. It sells for \$2.50 and is made by the Datatour Co., Toledo.



Autorite Luggage Carrier

The Autorite Luggage Carrier is shown on this page. When not in use it is folded down under the running board and has a special locking device, which, when the carrier is raised, puts it into position and holds it there. The price is \$6 and is manufactured by the Lanton Auto Equipment Co., Grand Central Terminal Bldg., New York.

No-Jolt Spring Checks are manufactured by C. M. Garland, First National Bank building, Chicago, and are designed to control the action of the car springs on the rebound and cause the springs to act the same as they do on deflection. They consist of a corrugated flat spring which is bolted into the top of a casing. The corrugated end meshes with projections in the bottom of the casing. The casing is provided with slots at each end and in one of the slots a strap is held by means of a tube loosely inserted into



Installation of the Dashgas Gage

the end of the strap which is riveted over.

Lithide Mfg. Co., 214 W. Ohio street, Pittsburgh, Pa., has produced the Lithide Radio Battery a line designed to meet every battery demand. Prices on these batteries range from \$16 to \$42.50.

The Dashgas Gage, shown on this page is designed for Ford cars. The diagram



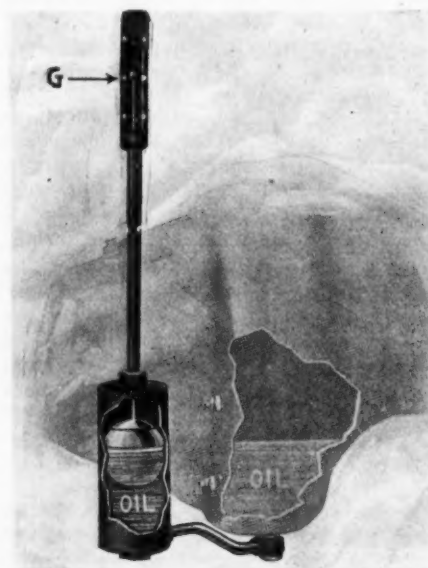
Johnson Tire Lock

shows method of installation on the touring model and the convenience of having the quantity of gas known at all times to the driver is apparent. Price \$6. It is made by the Rochester Mfg. Co., Inc., Rockwood St., Rochester, N. Y.

The Johnson Tire Lock is built of indestructible cable which cannot be cut, because it is armored with hardened steel beads which are interlocked and turn freely under every blow. The padlock is a specially hardened steel block with rounded corners. It has no projections or high spots to hit at and knock off, and cannot clog with dust or dirt because it is equipped with an automatic closing device which closes up the key-hole when the key is removed. It is made in lengths to fit every make of tire. Johnson Automobile Lock Co., St. Louis.

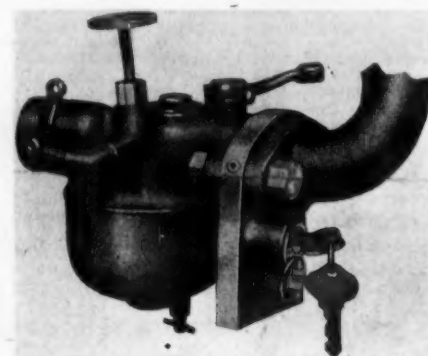
The Reflex Ignition Company of Cleveland has recently placed on the market its new Reflex Torpedo spark plug which was designed specifically for oil pumping motors, a condition which has proved to be the most common source of motor trouble.

This plug is of the closed end type, a feature which allows only a small amount of oil to enter the spark plug chamber, reducing the short circuiting or carbonizing to a minimum. The design of the core is that of the porcelain tip which is ball shaped. This is a construction which holds the heat at the end and in this way insures against fouling.



Burpee-Johnson Oil Gage

An oil gage or level indicator is being put on the market by the Burpee-Johnson Co., of Indianapolis. This device comprises a small chamber which is connected by a pipe to the flywheel housing in which the main oil supply on a Ford is carried. In this auxiliary chamber a float is provided and a wire extends upward to the indicator on the dash. The height of the indicator is determined by the level at which the float rests which in turn is determined by the amount of oil in the crankcase.



Sure-Lock

The Sure-Lock is constructed so that once attached, it cannot be removed. It is fitted between the carburetor and the manifold and when put on, becomes a part of the motor. It sells for \$8 and is made by the Sure-Lock Mfg. Co., Inc., Exchange Bldg., New Haven, Conn.

Accessory Dealers I Have Met

A Car Owner Tells Some of Good and Bad Impressions Made on Him By Various Dealers

IN the course of a number of years of driving automobiles of various makes in various kinds of businesses—real estate, insurance and selling of washing machines—I've purchased a large number of accessories in various towns and have, therefore, met a large number of accessory dealers. Some of the dealers thus met impressed me as being live wires, others impressed me more as being liabilities for their businesses than assets and still others made such a bad impression that it seemed to me they simply couldn't expect to keep on going much longer without radically changing their methods.

It has struck me that a review of the good, indifferent and poor accessory dealers I have met would be of interest to other dealers in that it would show them how the customer looks at the dealer and would give them some ideas and suggestions which would help them in getting more business.

Here, then, is a brief review of some of the more striking good and bad accessory dealers I have met:

A Man Who Was Too Sociable

A—was a middle-aged, genial sort of an individual with an apparently inexhaustible fund of stories and with no greater pleasure in life than the telling of stories. But it was just about as much as a man's life was worth to get any service out of him. Whenever I went to his store he'd start in on some tale, which he told inimitably, and I'd wait and wait and try to bring him to the point of transacting business, but wholly without success. The fact of the matter was that A— should have been on the stage. He had no business in the accessory business and it isn't at all surprising that eventually he lost his store and had to take up clerking in another man's establishment. The selling of accessories cannot be successfully combined with a vaudeville act.

Then there was the case of a young man who was extremely anxious to make a success of his accessory store not only for his own sake but because he'd persuaded his father-in-law to put in all his money in getting the store started, naturally under these circumstances he was on the job all the time, morning, noon and night, and was always trying his level best to sell more goods. But, unfortunately, this wasn't entirely a good thing for him because it made him over-zealous.

He was always urging and urging and urging his customers to buy more goods than they had come in the store to purchase. He ran the thing of "ask 'em to buy" into the ground and where the mere asking might have gotten good results

he became positively insistent and it was a real struggle to get out of the store. Of course this over-insistence drove people away from his establishment instead of increasing his business and I'm sorry to say that the store has now passed out of existence with a decided monetary loss to both himself and his father-in-law.

B— is one of the good accessory dealers I have met. His store is the leading accessory store in a city of about 75,000 and is a leader because it is always neat, clean and attractive, and is always well lighted, with goods splendidly displayed and with a good-looking bunch of alert salespeople anxious to wait on customers and give them the maximum service possible. B— himself is always on the job. He meets the customers himself, never gives any indication of feeling that he is far above his sales force or his customers and is a regular human being. Couple all these things with the fact that B— has a complete stock of accessories which he sells at the right prices and the reason for his big success becomes immediately apparent.

Another most interesting establishment is fairly crammed and jammed with services for the customers. On a prominent part of the right hand wall of the store, just inside the main entrance, there is a large board on which there is up-to-date information regarding road conditions in the territory about the city. Beneath this the daily weather bulletin, which is received by the store from the local government bureau, is placed and from this the motorist can see whether or not it is going to be so cold that he will need more alcohol in his radiator, or whether or not it is going to be sloppy and a good time to put on anti-skid chains. Other services performed by this store for customers, include such things as securing of auto licenses, the draining of crank cases and filling with oil, providing comfortable furniture in the store where autoists can rest and free telephone.

Petty Economies Don't Pay

C— ought to be making good in the selling of accessories but he isn't, and the reason he isn't is that he has an idea he can best make money by cutting corners. In other words he is always economizing at the wrong point. For instance, he has a pay telephone on his counter instead of a free phone for his customers. Again, he rents out the best space in his store, at the very front just inside the entrance, for a combination fruit stand and soda fountain. He figures that this stand will bring more people into his store and thus increase his chances of making sales, but it is

very seldom indeed that anyone who comes in to patronize the stand goes and buys an accessory.

By having the stand in his store he cuts down his selling space and divides the interests of the people coming into the store. If he was on a main traveled highway over which a large number of tourists regularly passed, this combination of accessories and refreshments would probably be a good thing but for a store in the heart of the city which is catering to the best local automobile trade this sort of thing hurts business more than it helps it. At least in the case of C— it is hurting business because he is constantly on the ragged edge of bankruptcy.

There is another odd sort of an accessory dealer who is always busy, whenever a customer comes into his store, at his desk signing letters or going over his records. His office is all cluttered up with filing cabinets and advertising literature and material of that sort. He seems to be all bound round with red tape and promotion stunts and he is always so busy with his letters and his records and his red tape that he has but little time to wait on customers. In fact, it always looks as though he actually resents the intrusion of customers and as though he begrudges the time spent with them. That, of course, is a mighty poor attitude for any accessory dealer to assume and it hurts his business considerably.

"Snappy" Service, Neat Fixtures—They Pull Business

One of the snappiest accessory stores imaginable is conspicuous for the fact that customers who patronize it get waited on in just about half the time, on the average, that it takes in less well organized concerns. And it seems to be a real pleasure to the owner and his salespeople to see to it that customers get what they want quickly.

Then there is a store located in the heart of the automobile section of a middle western town of about 80,000 and the most striking thing about this store is the fact that its gasoline pumps, its lubricating oil containers and pumps, its window displays and everything else connected with the store are always fresh and clean and attractive. No one can ever say that the pumps in front of this establishment need painting. No one can ever say that its window displays are dusty and dirty. No one can ever honestly make an adverse comment on the condition of the store's equipment or the appearance of the store itself. All of which is, naturally, a big boost for the store and all of which helps it to get more business.

COMING MOTOR EVENTS

AUTOMOBILE SHOWS

Brooklyn, N. Y.	Annual Automobile Show of the Brooklyn Motor Vehicle Dealers' Assn.	Feb. 24-Mar. 3
Youngstown, O.	Youngstown Automobile Dealers' Assn.	Feb. 24-Mar. 3
Albany, N. Y.	Annual Automobile Show	Feb. 24-Mar. 3
Des Moines, Iowa	Annual Show	Feb. 25-Mar. 5
Chicago	South Mid-Town Automobile Show at Midway Auditorium	Feb. 26-Mar. 3
Muskegon, Mich.	Annual Automobile Show	Feb. 26-Mar. 3
Syracuse, N. Y.	Annual Automobile Show	Feb. 26-Mar. 3
Springfield, Mass.	Annual Automobile Show	Feb. 26-Mar. 3
Omaha	Annual Automobile Show	Feb. 26-Mar. 3
Yonkers	Annual Automobile Show	Feb. 26-Mar. 3
Oklahoma City	Annual Automobile Show	Feb. 26-Mar. 3
Portland, Me.	Annual Automobile Show	Feb. 26-Mar. 3
Evansville, Ind.	Annual Automobile Show	Feb. 26-Mar. 3
Malone, N. Y.	Annual Automobile Show	Feb. 28-Mar. 3
Poughkeepsie, N. Y.	Annual Automobile Show	Feb. 28-Mar. 4
Mankato, Minn.	Mankato Automobile Assn.	Feb. 28-Mar. 4
Harrisburg, Pa.	Thirteenth Annual Automobile Show	Mar. 3-10
Ft. Worth, Tex.	Annual Spring Show	Mar. 3-10
Anaconda, Mont.	Annual Automobile Show	Mar. 3-10
Indianapolis	Indianapolis Trade Association	Mar. 5-10
Bay City, Mich.	Annual Automobile Show	Mar. 5-10
Duluth, Minn.	Duluth Automotive Dealers' Assn.	Mar. 5-10
Flushing, N. Y.	Third Annual Queens County Show	Mar. 5-10
Amsterdam, N. Y.	Annual Automobile Show	Mar. 5-10
Carlisle, Pa.	Chamber of Commerce Show	Mar. 5-10
Nashville, Tenn.	Annual Automobile Show	Mar. 5-11
San Antonio, Tex.	Annual Automobile Show	Mar. 5-11
Galesburg, Ill.	Annual Show	Mar. 6-10
Fairmont, W. a.	Annual Automobile Show	Mar. 6-10
Huntington, W. Va.	Automobile Show	Mar. 6-10
Oswego, N. Y.	Annual Automobile Show	Mar. 7-10
Saginaw, Mich.	Annual Automobile Show	Mar. 7-11
Elizabeth, N. J.	Fifth Annual Show	Mar. 8-17
Richmond, Va.	Annual Automobile Show	Mar. 10-17

Boston	Annual Automobile Show	Mar. 10-17
Newark, N. J.	Annual Automobile Show	Mar. 10-17
Washington, D. C.	Spring Show, Convention Hall	Mar. 11-17
Denver, Colo.	Annual Automobile Show	Mar. 11-18
Port Huron, Mich.	Annual Automobile Show	Mar. 12-17
Jacksonville, Ill.	Jacksonville Automobile Dealers' Assn.	Mar. 12-17
Great Falls, Mont.	Eighth Annual Show	Mar. 13-17
Greenwich, Conn.	Annual Automobile Show	Mar. 13-17
Denver, Colo.	Denver Automobile Dealers' Show	Mar. 14-17
Quincy, Ill.	Annual Automobile Show	Mar. 14-17
Kingston, N. Y.	Kingston Dealers' Annual Show	Mar. 15-17
Cumberland, Md.	Annual Automobile Show	Mar. 19-24
Battle Creek, Mich.	Annual Automobile Show	Mar. 19-24
Monmouth, Ill.	Monmouth Spring Festival	Mar. 23-31
Greenville, S. C.	Annual Automobile Show	Mar. 28-31
Bridgeton, N. J.	Eighth Annual Automobile Show	Mar. 31-Apr. 7
Auburn, N. Y.	Annual Automobile Show	April 4-7
Eau Claire, Wisc.	Annual Automobile Show	April 4-7
Alpena, Mich.	Annual Automobile Show	Apr. 2-7
Red Bank, N. J.	Eighth Annual Show	May 7-12
Green Bay, Wis.	Annual Automobile Show	Aug. 27-30
Sacramento	Annual Automobile Show	Sept. 8-8
Memphis	Annual Automobile Show	Sept. 28-30
Fresno, Calif.	Automobile Show	Sept. 28-Oct. 5
Little Rock, Ark.	Annual Automobile Show	Oct. 8-13
Waco, Texas	Waco Automobile Dealers' Assn.	Oct. 20-Nov. 5

CONVENTIONS

Quincy, Ill.	Annual Meeting Illinois Automotive Trade Association	Mar. 19
Oakland, Calif.	Annual Convention, Northern Division, California Automotive Trades Assn.	Mar. 19
Olympia, Wash.	Convention Washington Automotive Trade Association	July

RACES

Beverly, Calif.	Annual Automobile Show	Feb. 25
-----------------	------------------------	---------

SQUEEKS & RATTLES

If You Know Any, Tell Them to Us

SIMPLE

A little girl from the city who had been visiting friends on the farm, was being questioned as to what kind of a time she had had. Finally someone said, "I bet you don't know how to milk a cow."

"Bet I do," she replied.

On being pressed for particulars, as to how it was done, she said, "You take the cow into the barn and give her some breakfast food and water, and then—Well, then you just drain her crankcase."—A. H. Jennings.

Far?

There once was a man named Barr,
Who sported a mighty fast car
He stepped on the gas
But the train was too fast,
Now the heavenly gates are ajar.

—W. E. Allen

Rush it

to

Squeeks & Rattles

ONE CAUTIOUS FELLOW

She—"Don't you love driving?"
He—"Yes, but we are still in town."

Some automobile owners neglect their chassis and engine so that if the car is struck by a train at a crossroad they can swear that neither the driver nor anyone within a couple of blocks, for that matter, heard the locomotive whistle.

—Harry T. Gardner.

"Highways are the arteries of the Nation"—Headline.

A case where a little hardening of the arteries wouldn't do any harm, in some instances, says C. K.

Null—I bought a car the other day.

Void—What kind?

Null—An Ash.

Void—An Ash! You mean a Nash.

Null—No, an Ash; a second hand Cole.

—Ervin Miller.

Tale of the Gyp Tire

Lotsa bunk
About junk

Reads
Needs
Heeds
Writes
(Brief Span)
Blam!
D—n!
Never Again!

HOW BIG IS THE WORLD, ANYWAY?

A large manufacturer of automotive equipment prominently advertises to the public: "82 SERVICE STATIONS THROUGHOUT THE WORLD."

Of Course Not

Scene: Motor Age Telephone Information Service.

Garageman: "How do you figure the horsepower of an automobile?"

Information: "Square the bore time the—"

Garageman: "But I can't square it."

Information: "Why not?"

Garageman: "Because the cylinder is round."

"Joke Book is Found in King Tut's Tomb"—Headline.

"Now," comments Timely Films, "we know where these column conductors have been getting their jokes."

Specifications of Current Motor Truck Models

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES	Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES	Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES	Final Drive	
				Front Rear						Front Rear						Front Rear		
Ace.....30	1 1/2-1	\$2400	3 1/2x5	34x3 1/2 34x6	W	Corbitt.....B-22	2 1/2	\$3000	4 1/2x5 1/2	36x4 36x7	W	Gersix.....K	2 1/2	\$3500	4 1/2x5 1/2	36x4 36x8	W	
Ace.....40	2	2850	4 1/2x5 1/2	36x4 36x7	W	Corbitt.....R-22	3	3200	4 1/2x5 1/2	36x4 36x8	W	Gersix.....K	3 1/2	4500	4 1/2x5 1/2	36x5 40x12	W	
Ace.....60	2 1/2-3	3400	4 1/2x5 1/2	36x4 36x8	W	Corbitt.....A-22	3 1/2-4	3800	4 1/2x5 1/2	36x5 36x10	W	Gottfredson.....20	1 1/2-2	2075	3 1/2x5 1/2	34x5 34x5	W	
Acme.....20	1	.....	3 1/2x5	35x5n 35x5n	W	Corbitt.....AA-22	5	4500	4 1/2x6	36x6 40x6d	W	Gottfredson.....31	1 1/2-2	3000	4 1/2x5 1/2	36x6 38x7n	W
Acme.....30	1 1/2	.....	3 1/2x5	34x3 1/2 34x5	W	Day-Elder.....AS	1	1600	3 1/2x5	35x5n 35x5n	W	Gottfredson.....A	2 1/2	3375	4 1/2x5 1/2	36x5 36x10	W
Acme.....40	2	.....	3 1/2x5	34x3 1/2 34x5	W	Day-Elder.....B	1 1/2	2000	3 1/2x5	34x3 1/2 34x5	W	Gottfredson.....B	3 1/2-4	4475	4 1/2x5 1/2	36x6 40x14	W
Acme.....60	3	.....	4 1/2x5 1/2	36x4 36x7	W	Day-Elder.....D	2	2400	4 1/2x5 1/2	36x4 36x7	W	Gottfredson.....100	5-6	5500	5 1/2x6	36x6 40x14	W
Acme.....60L	3	.....	4 1/2x5 1/2	36x4 36x7k	W	Day-Elder.....D	2	2400	4 1/2x5 1/2	36x4 36x7	W	Graham Bros.....	1 1/2	1265	3 1/2x4 1/2	33x4 1/2 34x5n	B
Acme.....90	4 1/2	.....	4 1/2x5 1/2	36x5 40x10	W	Day-Elder.....D	2	2400	4 1/2x5 1/2	36x4 36x7	W	Graham Bros.....	1 1/2	1325	3 1/2x4 1/2	33x4 1/2 34x5n	B
Acme.....125	6 1/2	.....	4 1/2x6	36x6 40x12	W	Day-Elder.....C	2 1/2	2750	4 1/2x5 1/2	36x4 36x7	W	Graham Bros.....	1 1/2	1245	3 1/2x4 1/2	33x5n 33x5n	B
American.....25	2 1/2	3350	4 x6	36x4k 36x4dk	W	Day-Elder.....F	3 1/2	3150	4 1/2x5 1/2	36x5 36x5d	W	Graham Bros.....	1 1/2	1750a	3 1/2x4 1/2	33x4 1/2 36x6n	B	
American.....40	4	4275	4 1/2x6	36x5k 36x5dk	W	Day-Elder.....E	5	4250	4 1/2x6	36x5k 40x6dk	W	Graham Bros.....	2 1/2	2250a	4 1/2x5 1/2	36x5 36x5k	W	
American.....50	5	4500	4 1/2x6	36x5 36x12	W	Day-Elder.....E	5	4250	4 1/2x6	36x5k 40x6dk	W	Graham Bros.....	2 1/2	2475a	4 1/2x5 1/2	36x5 36x5k	W	
Armleder.....20	1	.....	3 1/2x5 1/2	34x3 1/2 34x5	W	Day-Elder.....E	5	4250	4 1/2x6	36x5k 40x6dk	W	Graham Bros.....	2 1/2	3300a	4 1/2x5 1/2	36x5 36x5k	W
Armleder.....21	1 1/2	.....	3 1/2x5 1/2	34x3 1/2 34x5	W	Day-Elder.....E	5	4250	4 1/2x6	36x5k 40x6dk	W	Graham Bros.....	2 1/2	4225a	4 1/2x5 1/2	36x5 36x5k	W
Armleder.....40-B	1 1/2	.....	4 1/2x5 1/2	34x3 1/2 34x5	W	Day-Elder.....E	5	4250	4 1/2x6	36x5k 40x6dk	W	Graham Bros.....	2 1/2	3850a	4 1/2x5 1/2	36x5 36x5k	W
Armleder.....40-C	1 1/2	.....	4 1/2x5 1/2	34x3 1/2 34x5	W	Day-Elder.....E	5	4250	4 1/2x6	36x5k 40x6dk	W	Graham Bros.....	2 1/2	4450a	4 1/2x5 1/2	36x6 40x6dk	W
Armleder.....HW-B	2 1/2	.....	4 1/2x5 1/2	36x4k 36x7k	W	Day-Elder.....E	5	4250	4 1/2x6	36x5k 40x6dk	W	Hall.....	1 1/2	3100	3 1/2x5	34x5n 38x7n	W
Armleder.....HW-C	2 1/2	.....	4 1/2x5 1/2	36x4k 36x7k	W	Day-Elder.....E	5	4250	4 1/2x6	36x5k 40x6dk	W	Hall.....	2 1/2	3275	4 1/2x5 1/2	36x4 36x6	W
Armleder.....KW-B	3 1/2	.....	4 1/2x5 1/2	36x5k 36x5dk	W	Day-Elder.....E	5	4250	4 1/2x6	36x5k 40x6dk	W	Hall.....	3 1/2	4100	4 1/2x5 1/2	36x5 36x5d	W
Armleder.....KW-C	3 1/2	.....	4 1/2x5 1/2	36x5k 36x5dk	W	Day-Elder.....E	5	4250	4 1/2x6	36x5k 40x6dk	W	Hall.....	5	5100	4 1/2x5 1/2	36x5 40x6d	W
*Atlas.....22	1	1495	3 1/2x5 1/2	34x4 1/2 34x4 1/2	W	Day-Elder.....E	5	4250	4 1/2x6	36x5k 40x6dk	W	Hall.....	7 chain	7	5100	4 1/2x5 1/2	36x5 40x6d	C
*Atlas.....44	1 1/2-2	1950	3 1/2x5 1/2	36x5n 36x5n	W	Day-Elder.....E	5	4250	4 1/2x6	36x5k 40x6dk	W	Harvey.....W O A	2	2650	4 1/2x5 1/2	34x4 34x7	W	
Atterbury.....20	1 1/2	2475	3 1/2x5	34x3 1/2 34x5	W	Day-Elder.....E	5	4250	4 1/2x6	36x5k 40x6dk	W	Harvey.....W F A	2 1/2	2950	4 1/2x5 1/2	36x4 36x7	W	
Atterbury.....22C	2 1/2	3375	4 1/2x5 1/2	36x4 36x4d	W	Day-Elder.....E	5	4250	4 1/2x6	36x5k 40x6dk	W	Harvey.....W H A	3 1/2	3950	4 1/2x6	36x5 36x5d	W	
Atterbury.....22C	2 1/2	3475	4 1/2x5 1/2	36x4 36x4d	W	Day-Elder.....E	5	4250	4 1/2x6	36x5k 40x6dk	W	Hawkeye.....O	1	1375	3 1/2x5 1/2	34x5n 34x5n	W	
Atterbury.....22D	3 1/2	4275	4 1/2x5 1/2	36x5 40x5d	W	Day-Elder.....E	5	4250	4 1/2x6	36x5k 40x6dk	W	Hawkeye.....K	1 1/2	1645	3 1/2x5 1/2	34x3 1/2 34x5k	I	
Atterbury.....22D	3 1/2	4375	4 1/2x5 1/2	36x5 40x5d	W	Day-Elder.....E	5	4250	4 1/2x6	36x5k 40x6dk	W	Hawkeye.....M	2	2145	4 1/2x5	36x4k 36x6k	I	
Atterbury.....8E	5	4975	4 1/2x6	36x5 40x6d	W	Day-Elder.....E	5	4250	4 1/2x6	36x5k 40x6dk	W	Hawkeye.....N	3 1/2	3700	4 1/2x5 1/2	36x5k 36x10k	I	
Atterbury.....8E	5	5125	4 1/2x6	36x5 40x6d	W	Day-Elder.....E	5	4250	4 1/2x6	36x5k 40x6dk	W	Hendrickson.....O	1 1/2	2200	3 1/2x5 1/2	36x4n 36x5n	W	
Autocar.....21UG	1 1/2-2	2200	4 1/2x4 1/2	34x4k 34x6	D	Day-Elder.....E	5	4250	4 1/2x6	36x5k 40x6dk	W	Hendrickson.....M	2 1/2	2690	4 1/2x5 1/2	36x4k 36x7k	W	
Autocar.....21UG	1 1/2-2	2500	4 1/2x4 1/2	34x4k 34x6	D	Day-Elder.....E	5	4250	4 1/2x6	36x5k 40x6dk	W	Hendrickson.....N	3 1/2	3000	4 1/2x5	36x5k 36x5k	W	
Autocar.....27H	2-3	3100	4 x5 1/2	34x5 36x7	D	Day-Elder.....E	5	4250	4 1/2x6	36x5k 40x6dk	W	Hendrickson.....K	5	4000	5 x6 1/2	36x6 40x6	W	
Autocar.....27K	2-3	3200	4 x5 1/2	34x5 36x7k	D	Day-Elder.....E	5	4250	4 1/2x6	36x5k 40x6dk	W	Huffman.....B	1 1/2-2	1795	3 1/2x5	34x3 1/2 34x6	W	
Autocar.....26Y	4-6	4200	4 1/2x5 1/2	36x6 36x12	D	Day-Elder.....E	5	4250	4 1/2x6	36x5k 40x6dk	W	Huffman.....C	1 1/2-2	1695	3 1/2x5 1/2	36x3 1/2 36x6	I	
Autocar.....26-B	4-6	4350	4 1/2x5 1/2	36x6 36x12	D	Day-Elder.....E	5	4250	4 1/2x6	36x5k 40x6dk	W	Huffman.....D	3-3	2895	4 1/2x5 1/2	36x4 36x7	W	
Available.....H1 1/2	1 1/2	2475	4 x5	36x3 1/2 36x5k	W	Day-Elder.....E	5	4250	4 1/2x6	36x5k 40x6dk	W	Hurlburt.....A-A	1-1 1/2	1950	3 1/2x5	34x5n 34x5n	W	
Available.....H2	2	2775	4 x5	36x3 1/2 36x8k	W	Day-Elder.....E	5	4250	4 1/2x6	36x5k 40x6dk	W	Hurlburt.....B-B	2-2 1/2	2800	4 1/2x5 1/2	36x4 36x4d	W	
Available.....H2 1/2	2 1/2	3160	4 x5	36x4k 36x5d	W	Day-Elder.....E	5	4250	4 1/2x6	36x5k 40x6dk	W	Hurlburt.....C-C	3-3 1/2	3475	4 1/2x5 1/2	36x5 36x5d	W	
Available.....H3 1/2	3 1/2	4175	5 x6	36x6 40x12	W	Day-Elder.....E	5	4250	4 1/2x6	36x5k 40x6dk	W	Hurlburt.....D-D	4-4 1/2	4150	4 1/2x6	36x5 36x5d	W	
Available.....H5	5	5375	5 x6	36x6 40x12	W	Day-Elder.....E	5	4250	4 1/2x6	36x5k 40x6dk	W	Hurlburt.....E-E	6-6 1/2	4850	4 1/2x6 1/2	36x6 40x6d	W	
*Avery.....1	1	.....	3 x4s	34x5n 34x5n	I	Day-Elder.....E	5	4250	4 1/2x6	36x5k 40x6dk	W	Indep'd't (Iowa).....B	1	1665	3 1/2x5	34x3 1/2 34x4	I
Beck.....A Jr.	1 1/4	1285a	3 1/2x5	34x4 1/2 34x4 1/2	I	Day-Elder.....E	5	4250	4 1/2x6	36x5k 40x6dk	W	Indep'd't (Iowa).....G	1 1/2	2040	3 1/2x5 1/2	34x3 1/2 34x5	I	
Beck.....B-30	1 1/2	1350	3 1/2x5	34x5 36x6	B	Day-Elder.....E	5	4250	4 1/2x6	36x5k 40x6dk	W	Indep'd't (Iowa).....H1	2 1/2	2940	4 1/2x5 1/2	36x4 36x7	I	
Beck.....C-40	2	1550	3 1/2x5	36x6 36x6	B	Day-Elder.....E	5	4250	4 1/2x6	36x5k 40x6dk	W	Indep'd't (Iowa).....10	1	.....	3 1/2x5 1/2	34x5n 34x5n	B
Beck.....D-50	2 1/2	1950	4 1/2x5 1/2	36x7 40x8	B	Day-Elder.....E	5	4250	4 1/2x6	36x5k 40x6dk	W	Indiana.....12	1 1/2-2	.....	3 1/2x5 1/2	34x3 1/2 34x5k	W
Bell.....M (Iowa)	1 1/2	1495	3 1/2x5 1/2	35x5 35x5n	W	Day-Elder.....E	5	4250	4 1/2x6	36x5k 40x6dk	W	Indiana.....20	2	.....	3 1/2x5 1/2	36x4k 36x7k	W
Bell.....E (Iowa)	1 1/2	2100	4 1/2x5 1/2	34x3 1/2 34x5	I	Day-Elder.....E	5	4250	4 1/2x6	36x5k 40x6dk	W	Indiana.....25	2 1/2-3	.....	3 1/2x5 1/2	36x4k 36x8k	W
Bell.....O (Iowa)	2 1/2	2550	4 1/2x5 1/2	34x4 34x6	I	Day-Elder.....E	5	4250	4 1/2x6	36x5k 40x6dk	W	Indiana.....35	3 1/2-4	.....	3 1/2x5 1/2	36x5k 36x5d	W
Bessemer.....G	1	1450	3 1/2x5	35x5n 35x5n	I	Day-Elder.....E	5	4250	4 1/2x6	36x5k 40x6dk	W	Indiana.....51	5-7	.....	5 x6 1/2	36x5k 40x6dk	W
Bessemer.....H-2	1 1/2	1990	3 1/2x5	36x3 1/2 36x5	D	Day-Elder.....E	5	4250	4 1/2x6	36x5k 40x6dk	W	*International.....S	1	1250	3 1/2x5	32x4 1/2 32x4 1/2	I	
Bessemer.....J-2	2 1/2	2895	4 1/2x5 1/2	36x4 36x4d	D	Day-Elder.....E	5	4250	4 1/2x6	36x5k 40x6dk	W	International.....21	1	1550	3 1/2x5 1/2	36x3 1/2 36x3 1/2	I	
Bessemer.....K-2	4	3695	4 1/2x5 1/2	36x5 36x10	I	Day-Elder.....E	5	4250	4 1/2x6	36x5k 40x6dk	W	International.....31	1 1/2	1650	3 1/2x5 1/2	36x3 1/2 36x5k	I	
Bethlehem.....KN	1	1195	3 1/2x5	35x5n 35x5n	B	Day-Elder.....E	5	4250	4 1/2x6	36x5k 40x6dk	W	International.....42	2 1/2	2100	3 1/2x5 1/2	36x3 1/2 36x6k	I	
Bethlehem.....GN	2	1795	4 x5 1/2	34x4 34x6k	D	Day-Elder.....E	5	4250	4 1/2x6	36x5k 40x6dk	W	International.....61	3	2400	4 1/2x5	36x4k 36x7k	I	
Bethlehem.....GN	3	2495	4 1/2x5 1/2	36x5 36x10	W	Day-Elder.....E	5	4250	4 1/2x6	36x5k 40x6dk	W	International.....62	3	2900	4 1/2x5	36x4 36x7	I	
Bristol.....C	2	2500	3 1/2x5	34x4 34x5	W	Day-Elder.....E	5	4250	4 1/2x6	36x5k 40x6dk	W	International.....101	5	3600	4 1/2x5	36x5 40x12k	I	
Bristol.....D	3	2975	4 1/2x5 1/2	36x4 36x7	W	Day-Elder.....E	5	4250	4 1/2x6	36x5k 40x6dk	W	International.....102	5	3800	4 1/2x5	36x5 36x12	I	
Brockway.....E	1	.....	4 x5	33x5n 33x5n	B	Day-Elder.....E	5	4250	4 1/2x6	36x5k 40x6dk	W	Jackson.....4WD	3 1/2	3850	4 1/2x5 1/2	36x7 36x7	B
Brockway.....S-5	1 1/2	.....	4 x5	36x4 36x6	W	Day-Elder.....E	5	4250	4 1/2x6	36x5k 40x6dk	W	K-Z.....1	1	1750	3 1/2x5	34x3 1/2 34x5	W
Brockway.....SK	1 1/2	.....	4 1/2x5 1/2	36x4 36x6	W	Day-Elder.....E	5	4250	4 1/2x6	36x5k 40x6dk	W	K-Z.....1 1/2	1 1/2	2075	3 1/2x5	36x4 36x6	W
Brockway.....KR	2 1/2	.....	4 1/2x5 1/2	36x4 36x8	W	Day-Elder.....E	5	4250	4 1/2x6	36x5k 40x6dk	W	K-Z.....2 1/2	2 1/2	2550	4 1/2x5 1/2	36x4 36x8	W
Brockway.....K-5	3 1/2	.....	4 1/2x5 1/2	36x4 36x8	W												

Specifications of Current Motor Truck Models—Continued

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES	Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES	Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES	Final Drive
				Front Rear						Front Rear						Front Rear	
Kleiber.....BB	2	\$3600	4 1/2 x 5 1/4	36x4k 36x7k	W	Ogden.....A2	1	.....	3 1/2 x 5	34x5n 34x5n	W	Selden.....90	5-7	\$4950	4 1/2 x 6	36x6 40x12	W
Kleiber.....B	2 1/2	3950	4 1/2 x 5 1/2	36x5k 36x8	W	Ogden.....D	1 1/2	.....	3 1/2 x 5	36x3 1/2 36x5	W	Seneca.....M	1 1/2	820	3 1/2 x 4 1/2	30x3 1/2 30x3 1/2	B
Kleiber.....C	3 1/2	4600	4 1/2 x 5 1/2	36x5 36x5d	W	Ogden.....E	1 1/2	.....	3 1/2 x 5	36x3 1/2 36x4k	W	*Service.....12	1 1/2	.....	3 1/2 x 4 1/2	32x4 1/2 32x4 1/2	B
Kleiber.....D	5	5300	5 x 6 1/2	36x6 40x12	W	Old Reliable.....A	1 1/2	\$2350	4 x 5	34x4 36x6	W	*Service.....15	1 1/2	.....	3 1/2 x 4 1/2	34x5n 34x5n	B
Koehler.....D	1 1/2	2150	3 1/2 x 5	34x3 1/2 34x5	W	Old Reliable.....B	2 1/2	3500	4 1/2 x 6	34x4 36x4d	W	*Service.....21	1 1/2	.....	3 1/2 x 4 1/2	34x5 34x5	W
Koehler.....M	2 1/2	3175	4 x 5 1/2	36x4 36x7	W	Old Reliable.....C	3 1/2	4250	4 1/2 x 6	36x5 36x5d	W	*Service.....32	2	.....	4 x 5 1/2	36x4 36x7	W
Koehler.....MCS	2 1/2	3275	4 x 5 1/2	36x4 36x7	W	Old Reliable.....D	5	5000	4 1/2 x 6	36x6 40x6d	W	*Service.....32	2	.....	4 1/2 x 5 1/2	35x5n 36x7n	W
Koehler.....F	3 1/2	4470	4 1/2 x 5 1/2	36x5 36x10	W	Old Reliable KLM	7	6000	4 1/2 x 6	36x6 40x7d	C	*Service.....52	3	.....	4 1/2 x 5 1/2	36x5 36x8	W
Koehler, MT. Trac	3 1/2	3275	4 x 5 1/2	36x4 36x7	W	*Oldsmobile Econ	1	1095	3 1/2 x 5 1/2	35x5n 35x5n	W	*Service.....72	3 1/2	.....	4 1/2 x 5 1/2	36x5 36x5d	W
Krebs.....23	3 1/2	1360	3 1/2 x 5	34x4 1/2 34x4 1/2	B	Olympic.....A	2 1/2	3200	4 1/2 x 5 1/2	36x4 36x8	W	*Service.....77	4	.....	4 1/2 x 6	36x5 36x5d	W
Krebs.....24	1	1675	3 1/2 x 5	34x5 34x5	W	Oneida.....B9	1 1/2	2825	4 x 5 1/2	36x3 1/2 36x7	W	*Service.....102	6	.....	4 1/2 x 6	36x6 40x6d	W
Krebs.....45	1 1/2	2275	4 1/2 x 5 1/2	36x4 36x7	W	Oneida.....C9	2 1/2	3200	4 x 5 1/2	36x4 36x8	W	Signal.....NF	1	.....	3 1/2 x 5	34x5n 36x6n	W
Krebs.....75	2 1/2	2550	4 1/2 x 5 1/2	36x4 36x8	W	Oneida.....D9	3	4050	4 1/2 x 5 1/2	36x5 36x10	W	Signal.....H	1 1/2	.....	4 1/2 x 5 1/2	34x4 36x6	W
Krebs.....110	3 1/2	3175	4 1/2 x 5 1/2	36x5 40x10	W	Oneida.....E9	5	4725	4 1/2 x 5 1/2	36x6 40x12	W	Signal.....J	2 1/2	.....	4 1/2 x 5 1/2	34x4 36x8	W
Krebs.....140	5	.....	4 1/2 x 6	36x6 40x6d	W	Oshkosh.....A	2	2485	3 1/2 x 5	36x6n 36x6n	B	Signal.....M	3 1/2	.....	4 1/2 x 5 1/2	36x5 40x6d	W
						Oshkosh.....AA	2	2585	3 1/2 x 5	36x6n 36x6n	B	Signal.....R	5	.....	4 1/2 x 6	36x6 40x6d	W
						Oshkosh.....B	2 1/2	3485	4 x 5 1/2	38x7n 38x7n	B	*Standard.....75	1 1/2	1330	3 1/2 x 5	33x5n 33x5n	W
						Oshkosh.....BB	2 1/2	3585	4 x 5 1/2	38x7n 38x7n	B	*Standard.....1-K	1 1/2	1600	3 1/2 x 5	34x5 34x5k	W
						*Overland.....4	1 1/2	425	3 1/2 x 4	30x3 1/2 30x3 1/2	B	*Standard.....66	2 1/2	2400	4 1/2 x 5 1/2	36x5 36x12	W
Larrabee.....X-2	1	1025	3 1/2 x 4 1/2	34x5n 34x5n	B	Packard.....EC	2-3	3100	4 1/2 x 5 1/2	36x4 36x7	W	*Star.....5-K	5-7	4100	4 1/2 x 6	36x6 40x14	W
Larrabee.....U	1 1/2	2400	3 1/2 x 5	34x3 1/2 34x5	W	Packard.....ED	2-2 1/2	3100	4 1/2 x 5 1/2	36x6n 40x8n	W	Sterling.....1	1 1/2	6106	3 1/2 x 4 1/2	30x3 1/2 30x3 1/2	W
Larrabee.....U	1 1/2	2400	3 1/2 x 5	34x3 1/2 34x5k	W	Packard.....EX	2-2 1/2	3100	4 1/2 x 5 1/2	36x6n 40x8n	W	Sterling.....2	1 1/2	2885	4 x 5 1/2	36x3 1/2 36x5k	W
Larrabee.....K	2 1/2	3100	4 1/2 x 5 1/2	36x4 36x7	W	Packard.....EJ	4	4100	4 1/2 x 5 1/2	36x5 36x5d	W	Sterling.....3	2 1/2	3085	4 x 5 1/2	36x4k 36x6k	W
Larrabee.....K-5	2 1/2	3450	4 1/2 x 5 1/2	36x4 36x8	W	Packard.....EF	5-7 1/2	4500	4 x 5 1/2	36x6 40x6d	W	Sterling.....3 1/2	3 1/2	3290	4 1/2 x 5 1/2	36x4k 36x4k	W
Larrabee.....L-4	3 1/2	4000	4 1/2 x 5 1/2	36x5 36x5d	W	Paige.....52-19	1 1/2	1950	4 x 5 1/2	34x4 34x5	W	Sterling.....5-W	5	4325	4 1/2 x 6	36x5k 40x5d	W
Larrabee.....W	5-7	4800	4 1/2 x 6	36x6 40x6d	W	Paige.....54-20	1 1/2	2420	4 1/2 x 5 1/2	34x4 34x8	W	Sterling.....5-C	5	4950	5 x 6 1/2	36x6 40x6d	C
						Paige.....51-18	3 1/2	3145	4 1/2 x 5 1/2	36x5 36x5d	W	Sterling.....7-2	7 1/2	5500	5 x 6 1/2	36x6 40x6d	C
Maccar.....L	1 1/2	.....	4 1/2 x 5 1/2	36x4 36x6	W	Parker.....C-22	1	1875	3 1/2 x 5 1/2	34x5n 34x5n	W	*Stewart.....Utility	1 1/2-1 1/2	6000	5 x 6 1/2	36x6 40x7d	C
Maccar.....H-A	2	.....	4 1/2 x 5 1/2	36x4 36x4d	W	Parker.....G-22	2 1/2	3200	4 1/2 x 6	34x4 36x4d	W	*Stewart.....15	1 1/2-1 1/2	1245	3 1/2 x 5 1/2	34x4 34x4 1/2	I
Maccar.....H-2	3	.....	4 1/2 x 5 1/2	36x4 36x5d	W	Parker.....J-20	3 1/2	3050	4 1/2 x 6	36x5 40x5d	W	Stewart.....9	1 1/2-2	1445	3 1/2 x 5 1/2	34x5n 35x5n	I
Maccar.....M-3	4	.....	4 1/2 x 5 1/2	36x5 36x6d	W	Parker.....M-20	5	4850	5 x 6	36x6 40x6d	W	Stewart.....7-X	2 1/2-3	1790	3 1/2 x 5	34x3 1/2 34x6	I
Maccar.....G	5-6	.....	4 1/2 x 6	36x5 40x6d	W	Patriot.....Revere	1	1380	3 1/2 x 5	35x5n 35x5n	W	Stewart.....10-X	3 1/2	2390	4 1/2 x 5 1/2	34x4 34x8	I
MacDonald.....A	7 1/2	5750	4 1/2 x 6	40x7 40x14	I	Patriot.....Lincoln	2	2050	4 x 5 1/2	34x4 34x6	W	*Stewart.....11	1 1/2	3190	4 1/2 x 6	36x5 36x10	I
Mac.....AB D.R.	1 1/2	3450	4 x 5	36x4k 36x3 1/2 36x4k	D	Patriot.....LS-800	2	2175	4 x 5 1/2	34x4 34x6	W	Stoughton.....A	1	1245	4-3 1/2 x 5 1/2	34x4 34x4 1/2	W
Mac.....AB Chain	1 1/2	3000	4 x 5	36x4k 36x3 1/2 36x4k	D	Patriot.....Washg'tn	3	2900	4 1/2 x 5 1/2	36x5 36x7	W	Stoughton.....B	1 1/2	1095	3 1/2 x 5	34x4 34x4 1/2	B
Mac.....AB Chain 2	2	3300	4 1/2 x 5	36x4k 36x4dk	D	Pierce-Arrow.....2	2	3200	4 x 5 1/2	36x4 36x4d	W	Stoughton.....D	2	1790	3 1/2 x 5 1/2	34x5n 34x5n	W
Mac.....AB D.R.	2 1/2	3750	4 1/2 x 5	36x4k 36x4dk	D	Pierce-Arrow.....3 1/2	3 1/2	4350	4 1/2 x 6 1/2	36x5 36x5d	W	Stoughton.....B	2	2150	4 1/2 x 5 1/2	36x3 1/2 36x5	W
Mac.....AB D.R.	2 1/2	3850	4 1/2 x 5	36x4k 36x4dk	D	Pierce-Arrow.....5	4	4850	4 1/2 x 6 1/2	36x5 40x6d	W	Stoughton.....D	2	2490	4 x 5 1/2	36x4 36x7	W
Mac.....AB Chain	2 1/2	3400	4 1/2 x 5	36x4k 36x4dk	C	Pittsburgher.....1	5-2	3000	4 1/2 x 6	36x4 36x6	W	Stoughton.....F	3	3150	4 1/2 x 5 1/2	36x5d 36x5d	W
Mac.....AC Chain	2 1/2	4950	5 x 6	36x5k 40x5d	C	Pittsburgher.....3	3	3800	4 1/2 x 6 1/2	36x5k 36x7	W	Sullivan.....E	2	2800	4 1/2 x 5 1/2	36x4k 36x7k	W
Mac.....AC Chain	6 1/2	5500	5 x 6	36x6 40x6d	C	Power.....F	2	3150	4 x 5 1/2	36x5 36x7	W	Sullivan.....H	3 1/2	3750	4 1/2 x 6	36x5 36x5d	W
Mac.....AC Chain	6 1/2	5750	5 x 6	36x6 40x12	C	Power.....C	3 1/2	.....	4 1/2 x 5 1/2	36x5 40x10	W						
Mac.....AC Chain	7 1/2	6000	5 x 6	36x7 40x7d	C	Premocar.....B-143	1 1/2	2475	3 1/2 x 5	36x6n 36x6n	W						
Mac Trac.....AB	5	3400	4 1/2 x 5	36x4 36x4d	C												
Mac Trac.....AC	7	4950	5 x 6	36x5 40x5d	C	*Rainier.....R-21	3 1/2	.....	3 1/2 x 5	35x5n 35x5n	W	*Thomart.....	1 1/2	1795	4 x 5 1/2	34x5 34x5	C
Mac Trac.....AC	10	5500	5 x 6	36x6 40x6d	C	Rainier.....R-21	3 1/2	.....	3 1/2 x 5	35x5n 35x5n	W	Tiffin.....GW	1 1/2	2100	4 1/2 x 5 1/2	36x3 1/2 36x5	W
Mac Trac.....AC	13	5750	5 x 6	36x6 40x12	C	Rainier.....R-26	1 1/2	.....	3 1/2 x 5	34x3 1/2 34x4	W	Tiffin.....MW	2 1/2	2700	4 1/2 x 5 1/2	36x4 36x3 1/2	W
Mac Trac.....AC	15	6000	5 x 6	36x7 40x7d	C	Rainier.....R-26	1 1/2	.....	3 1/2 x 5	34x3 1/2 34x5	W	Tiffin.....PW	3 1/2	3600a	4 1/2 x 5 1/2	36x5 40x5d	W
*Mapleleaf.....	1 1/2	3000	3 1/2 x 5 1/2	34x5n 36x6n	W	Rainier.....R-28	2	.....	4 1/2 x 5 1/2	34x4 34x6	W	Tiffin.....UW	6	4300	4 1/2 x 6	36x6 40x6d	W
*Mapleleaf.....AA	2	3600	4 x 5 1/2	36x4 36x7	W	Rainier.....R-28	2	.....	4 1/2 x 5 1/2	34x4 34x6	W	Titan.....	2	2750	4 x 5	36x4k 36x7k	D
*Mapleleaf.....BB	3	4050	4 1/2 x 5 1/2	36x4 36x4d	W	Rainier.....R-20	2 1/2-3	.....	4 1/2 x 5 1/2	34x4 34x7	W	Titan.....	2 1/2	2700	4 1/2 x 5 1/2	36x4k 36x8k	D
*Mapleleaf.....C	4	4800	4 1/2 x 5 1/2	36x5 36x5d	W	Rainier.....R-15	3 1/2-5	.....	4 1/2 x 5 1/2	36x5 36x5d	W	Titan.....	3 1/2	3600	4 1/2 x 6	36x5k 40x10k	D
*Mapleleaf.....DD	5	5625	4 1/2 x 5 1/2	36x6 40x6d	W	Rainier.....R-25	3 1/2-5	.....	4 1/2 x 5 1/2	36x5 36x5d	W	Titan.....	5	4100	4 1/2 x 6	36x5 40x12	D
Masson.....	1	1200	4 x 5	34x5n 34x5n	B	Rainier.....R-17	5-6	.....	4 1/2 x 6	36x6 40x6d	W	Tower.....J	1 1/2	2000	4 1/2 x 5 1/2	35x5n 36x7n	W
Master.....JW	1 1/2	2290	4 1/2 x 5 1/2	34x3 1/2 34x5	D	Rainier.....R-27	6	.....	4 1/2 x 6	36x6 40x6d	W	Tower.....H	2 1/2	2475	4 1/2 x 5 1/2	36x4 36x7	W
Master.....JD	1 1/2	2590	4 1/2 x 5 1/2	34x3 1/2 34x6	D	Ranger.....TK-20-2	1 1/2	1450	3 1/2 x 5	36x6n 38x7n	B	Tower.....G	3 1/2	3475	4 1/2 x 5 1/2	36x5 36x5d	W
Master.....Z	2	2290	4 1/2 x 5 1/2	34x3 1/2 34x5	W	*Ren.....	5 1/2-11	1185	4 1/2 x 4 1/2	34x4 34x4 1/2	B	Traffic.....	1 1/2	1595a	3 1/2 x 5	35x5n 35x5n	I
Master.....DD	2 1/2	3193	4 1/2 x 5 1/2	34x4 36x7	D	Reliance.....10A	1 1/2	2400	4 x 5 1/2	36x3 1/2 36x5	I	Traffic.....C	2	1805a	3 1/2 x 5	34x3 1/2 34x5k	I
Master.....A	3 1/2	3990	4 1/2 x 6	36x5 40x8	D	Reliance.....20B	2 1/2	3100	4 1/2 x 5 1/2	36x4 36x4d	I	Traffic.....15	1	1295	3 1/2 x 5	36x4 36x7	I
Master.....E	3 1/2	4290	4 1/2 x 6	36x5 40x5d	D	Republic.....75	3 1/2	1395b	3 1/2 x 5	32x4 1/2 32x4 1/2	I	*Transport.....	15	1295	3 1/2 x 5	32x4 1/2 32x4 1/2	B
Master.....Y	4	4490	4 1/2 x 6	36x5 40x6d	D	Republic.....10	1	1395	3 1/2 x 5	34x3 34x4	I	*Transport.....25	1 1/2	1495	4 1/2 x 5 1/2	34x3 1/2 34x5k	I
Master.....B	5	4990	4 1/2 x 6 1/2	36x6 40x6d	D	Republic.....10 Exp	1	1695	3 1/2 x 5	34x5n 34x5n	I	*Transport.....35	3	1835a	3 1/2 x 5	36x4k 36x6k	I
Master.....F	5	5090	4 1/2 x 6 1/2	36x6 40x6d	D	Republic.....11X	1 1/2	1795	3 1/2 x 5	34x4 34x6	I	*Transport.....55	3	2335	4 1/2 x 5 1/2	36x4k 36x8k	I
Master Trac.....DDT	6	3390	4 1/2 x 5 1/2	34x4 36x7	D	Republic.....19	2 1/2	2195	4 1/2 x 5 1/2	36x4 36x7	I	*					

Specifications of Current Motor Truck Models—Continued

NAME AND MODEL	Tons Capacity	Chassis Price	TIRES		Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke		TIRES		Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke		TIRES		Final Drive
			Front	Rear					Front	Rear	Front	Rear									
Veteran.....P**	2	\$3699	4 1/2 x 5 1/2	36x4	36x7	W	White.....20	2	\$3250	3 1/2 x 5 1/2	36x4k	36x7k	D	Wilcox.....AA	1	\$1900	3 1/2 x 5 1/2	36x4k	36x4k	W	
Veteran.....R**	3	4200	4 1/2 x 5 1/2	36x4	36x7	W	White.....40	3 1/2	4200	3 1/2 x 5 1/2	36x5	40x5d	D	Wilcox.....BB	1 1/2	2550	4 1/2 x 5	36x4	36x5	W	
Veteran.....S**	4	5395	4 1/2 x 6	36x5	36x10	W	White.....45	5	4500	4 1/2 x 5 1/2	36x6	40x6d	D	Wilcox.....D	2 1/2	3000	4 1/2 x 5	36x4k	36x3 1/2 k	W	
*Vim.....50	5 1/2	995	4 x 5	32x4n	32x4n	B	Wichita.....K	1	1875	3 1/2 x 5 1/2	36x3 1/2	36x4k	W	Wilcox.....E	3 1/2	3950	4 1/2 x 6	36x5k	36x5k	W	
Walker-JohnsonA	2	2500	3 1/2 x 5	34x3 1/2	34x6	W	Wichita.....M	2	2400	3 1/2 x 5 1/2	36x3 1/2	36x6k	W	Wilcox.....F	5	4350	4 1/2 x 6 1/2	36x5	40x6d	W	
Walker-JohnsonB	3	3000	4 1/2 x 5 1/2	36x4	36x8	W	Wichita.....RX	3	3200	4 1/2 x 5 1/2	36x4k	36x8k	W	Wilson.....F	1 1/2	2270	3 1/2 x 5	36x3 1/2	36x5	W	
Walter.....M	2 1/2	3850	4 1/2 x 5 1/2	36x4	36x8	D	Wichita.....O	4	3500	4 1/2 x 6 1/2	36x5k	36x5k	W	Wilson.....EA	2 1/2	2825	4 1/2 x 5 1/2	36x4	36x7	W	
Walter.....S	3	4850	4 1/2 x 6 1/2	36x6	40x6d	W	FINAL DRIVE:—B—Bevel, C—Chain, D—Double Reduction, I—Internal Gear, W—Worm.														
*Watson.....C	1	1465a	3 1/2 x 5 1/2	35x5n	35x5n	W															
Watson.....N	3 1/2	4250	4 1/2 x 5 1/2	36x5	36x10	W	r—8 cyl. s—6 cyl. t—2 cyl.—all others are 4 cyl. d—dual tires. k—pneumatic tires optional at extra cost. n—pneumatic tires. a—price includes several items of equipment. b—price includes body. *—express truck or delivery wagon. **—Canadian Make, trac.—tractor.														
Western.....W1 1/2	1 1/2	2450	4 1/2 x 5 1/2	36x3 1/2	36x5k	W															
Western.....L1 1/2	1 1/2	2450	3 1/2 x 5	36x3 1/2	36x5k	W															
Western.....W2 1/2	2 1/2	3250	4 1/2 x 5 1/2	36x4	36x7	W															
Western.....L2 1/2	2 1/2	2450	4 1/2 x 6	36x4	36x7	W															
Western.....W3 1/2	3 1/2	4000	4 1/2 x 6	36x5	40x5d	W															
*White.....15	3 1/2	2400	3 1/2 x 5 1/2	34x5n	34x5n	B															

Specifications of Current Passenger Car Models

PRICES						Wheel Base	Tires	Engine Make	Cylinders and Stroke	Rated Horse Power (N.A.C.C.)	NAME AND MODEL	Carburetor	Starting and Lighting	Ignition	Clutch Type and Make	Gearset	Universal: Type and Make	Rear Axle Type and Make	Gear Ratio
2-Pass.	3-Pass.	7-Pass.	Sport	Coupe	Sedan														
\$1995c	\$1785	\$1850	1855c		\$2485	127	33x4 1/2	H-S.	6-31x5 1/2	29.40	American.....D-66	Strom.	G-D.	A-K	s-p B&B.	B & B.	m Hartford.	F Salis.	4.75
	1650				127	33x4	Own.		6-31x4 1/2	23.44	American.....Steamer	None	L-N	West.	None	None	f Universal.	1/2 F Salis.	1.75
	1135				114	32x4	Cont.		6-31x4 1/2		Anderson.....41	Zenith.	West.	West.	s-p B&B.	Durston.	f Universal.	1/2 F Salis.	4.62
1495	1495	1595	1785b 1915c	1905c	1995d	120	33x4	Cont.	6-31x4 1/2	27.34	Anderson.....Series 50	Rayfield.	Remy.	Remy.	s-p B&B.	Durston.	f Universal.	3/4 F Salis.	4.62
	1535				114	32x4 1/2			6-31x4 1/2	23.44	Apperson.....6	Strom.	Remy.	Remy.					
	2800	2900		3625	3850f 3750d	130	31x4 1/2	Own.	8-31x5	33.80	Apperson.....8-21-S	Johnson.	Bijur.	Remy.	m-d Own.	Own.	m Sterling.	1/2 F Own.	4.25
	1275	1345	1-05c 1995m	1965 1/2	2245	121	32x4	Cont.	6-31x4 1/2	27.34	Auburn.....6-51	Strom.	Remy.	Remy.	s-p B&B.	G-L.	m Universal.	F Salis.	4.75
	1095				1025a	1465	111	31x4	Cont.	6-31x4 1/2	23.44	Auburn.....6-43	Strom.	Remy.	Remy.	s-p B&B.	Warner.	1/2 F Col.	
	1395				1405d	1850i	122	32x4 1/2	Cont.	6-31x5	25.35	Auburn.....6-63	Strom.	Remy.	Remy.	s-p B&B.	Warner.	1/2 F Col.	
805	885	725c		1175	1395	109	31x4	Own.	4-35x4 1/2	18.23	Barley.....	Strom.	Delco.	Delco.	s-p B&B.	Fuller.	f M&E.	1/2 F Col.	4.58
	1175	1105	075c	1935	1955	118	33x4 1/2	Own.	6-31x4 1/2	27.34	Buick 1923-34-5-6-7-35	Marvel.	Delco.	Delco.	m-d Own.	Own.	m Own.	1/2 F Own.	4.66
		1435	1625a 1075c	1805	2195	124	33x4 1/2	Own.	6-31x4 1/2	27.34	Buick 1923-41-4-5-47	Marvel.	Delco.	Delco.	m-d Own.	Own.	m Own.	F Own.	4.40
											Buick 1923 48-9-50-4-55	Marvel.	Delco.	Delco.	m-d Own.	Own.	m Own.	F Own.	4.40
2885	2885	2885		3675	3950	132	33x5	Own.	8-31x5 1/2	31.25	Cadillac.....61	Own.	Delco.	Delco.	m-d Own.	Own.	m Spicer.	F Tim.	Opt.
	1750b	1790	2230d	2480	2875b	122	32x4 1/2	Cont.	6-31x4 1/2	27.34	Case.....X	Rayfield.	Delco.	Delco.	m-d Own.	Own.	f Sneed.	1/2 F Col.	4.66
	1185	1185	199j	2480c	2875b	129	31x4 1/2	Cont.	6-31x5 1/2	31.54	Case.....W	Rayfield.	Delco.	Delco.	m-d Own.	Own.	f Arvaco.	1/2 F Col.	4.45
		1845		1505	1850d	117	32x4	Own.	6-31x4 1/2	25.35	Chalmers.....1923	Strom.	A-L.	Remy.	m-d Own.	Own.	m Hardy.	1/2 F Adams.	5.13
1595c	1395d	1545		1695d	2195d	122	32x4	Own.	6-31x4 1/2	25.35	Chalmers.....1923	Strom.	A-L.	Remy.	m-d Own.	Own.	m Hardy.	1/2 F Adams.	5.13
					12295f	123	33x4	Own.	6-31x5	29.40	Chandler.....Six	Rayfield.	Bosch.	Bosch.	s-p B&B.	Own.	f Own.	F Own.	4.45
510	525	425c		840c	800	103	30x3 1/2	Own.	4-31 1/4	21.76	Chevrolet.....Superior	Zenith.	Remy.	Remy.	e Own.	Own.	m Own.	1/2 F Own.	3.77
				880k								A-L.	Holley						
710	725	625		1040c	1060	103	30x3 1/2	Own.	4-31x3 1/2	19.60	Chevrolet.....M	Cartier.	Remy.	Remy.	m-d Own.	Own.	m Mech.	1/2 F Own.	4.44
1085b	995		1260d	1485d	112 1/2	31x4	Own.	6-31x4 1/2	22.50	Cleveland.....42	Strom.	Bosch.	Bosch.	s-p B&B.	Own.	m Mech.	1/2 F Own.	4.90	
1885		1885	1885c	2535b	2685f	127 1/2	33x5	Nort.	8-31x4 1/2	39.20	Cole.....890	Johnson.	Delco.	Delco.	m-d North.	Own.	m Spicer.	1/2 F Col.	4.70
	1475			1995c	1995d	115	32x4	Cont.	6-31x4 1/2	27.34	Columbia.....Big Six	Strom.	A-L.	A-K.	s-p B&B.	Durston.	m Spicer.	1/2 F Tim.	4.75
995	985		1395d	1235a	1395d	115	31x4	Cont.	6-31x4 1/2	23.44	Columbia.....Light Six	Strom.	A-L.	A-L.	s-p B&B.	Durston.	m Spicer.	1/2 F Tim.	4.80
1195	1235		1195b 1365c	2055d 1875 1/2	2055d	116	32x4	Falls.	6-31x4 1/2	23.44	Courier.....	Strom.	West.	A-K	s-p B&B.	Muncie.	f Flexite.	1/2 F Col.	5.00
		3000		3500c	4500	138	33x4 1/2	Cont.	6-31x5 1/2	31.54	Crawford.....23-6-60	Zenith.	West.	Bosch.	m-d B-L.	B-L.	m Spicer.	1/2 F Tim.	4.45
	4350b	4350	435	c 5350c	6000	132	33x5	Own.	8-31x5 1/2	45.00	Crawford-Dagmar.....6-70	Zenith.	West.	Bosch.	m-d B-L.	B-L.	m Spicer.	1/2 F Tim.	4.45
1495b	1295	1495c	1795c	1795d	115	31x4	Cont.	6-31x4 1/2	23.44	Cunningham.....V	Strom.	Delco.	Delco.	m-d Own.	Own.	f Sneed.	F Tim.	4.23	
1595	1595	1095	2095		120	32x4	Cont.	6-31x4 1/2	27.34	Daniels.....23-38	Strom.	Delco.	Delco.	m-d Own.	Own.	m Spicer.	F Tim.	4.23	
850	880		980b	1440d	114	32x4	Own.	4-31x4 1/2	24.03	Davis.....71	Strom.	Delco.	Delco.	s-p B&B.	Warner.	m Peters.	1/2 F Tim.	5.10	
		3950c	3950	4150c	5750f	132	33x5	Own.	6-4 x5	38.40	Davis.....63-65	Strom.	Delco.	Delco.	s-p B&B.	Warner.	m Peters.	1/2 F Tim.	5.13
865	865		1015a	1020k	1070k	133	31x4	D-Ly.	4-31x5 1/2	19.60	Dodge Brothers.....	Stewart.	N.E.	N.E.	m-d Own.	Own.	m Own.	1/2 F Own.	4.16
990	990		1145	1195	115	31x4	Falls.	6-31x4 1/2	23.44	Dorris.....6-80	Strom.	West.	Bosch.	Conn.	m-d Detlafl.	Warner.	m Spicer.	1/2 F Tim.	4.23
			1365	1495d	1750d	134	33x5	Own.	8-27x5 1/2	26.45	Dort.....19-14	Cartier.	Bosch.	Bosch.	m-d Detlafl.	Own.	m Mech.	1/2 F Flint.	4.66
5750	5507	5900	5750	7250c	7500d	134	33x5	Own.	8-27x5 1/2	26.45	Dort.....25-20	Cartier.	Bosch.	Bosch.	m-d Detlafl.	Own.	m Mech.	1/2 F Flint.	4.66
840	890		1095c	1365	1365	109	31x4	Cont.	4-37x4 1/2	24.03	Duesenberg.....Straight 8	Strom.	Delco.	Delco.	s-p Own.	Own.	f Climax.	1/2 F Own.	4.45
	1600	1650		2250	2400	123 1/2	32x4 1/2	Anst.	6-31x4 1/2	25.35	Durant.....A-22	Till.	A-L.	A-L.	s-p Own.	Warner.	m Spicer.	1/2 F Adams.	4.33
1485	1095		1165d	1795c	1795d	112	32x4	Own.	4-31x5 1/2	18.91	Durant.....B-22	Rayfield.	A-L.	A-L.	s-p Ansted.	Warner.	m Spicer.	1/2 F Tim.	5.15
1395	965			1425d	112	31x4	Lyc.	4-31x5 1/2	19.60	Earl.....40	Strom.	A-L.	Conn.	s-p B&B.	Own.	f Own.	1/2 F Own.	4.87	
1045				1975	2065	118	33x4	Cont.	6-31x4 1/2	25.35	Elcar.....4-40	Strom.	Delco.	Delco.	s-p B&B.	Muncie.	m Peters.	1/2 F Salis.	4.50
1195c				1145	1245k	108 1/2	32x4	Own.	4-31x5 1/2	18.23	Elcar.....6-60	Strom.	Delco.	Delco.	m-d Warner.	Warner.	m Spicer.	1/2 F Salis.	4.50
269r	295	235c		1895c	1985d	120	32x4 1/2	Cont.	6-31x5	27.34	Essex.....	Own.	Bosch.	Bosch.	m-d Own.	Own.	m Spicer.	1/2 F Own.	4.66
				530	595	100	30x3 1/2	Own.	4-31x4	22.50	Flint.....	Strom.	A-L.	A-L.	s-p B&B.	Warner.	m Spicer.	1/2 F Adams.	4.66
				725							Ford.....T	Own.	Own.	Own.	m-d Own.	Own.	m Own.	1/2 F Own.	3.63
3900	2975			4900	4900d	132	32x4 1/2	Own.	6-31x5 1/2	27.34	Fox.....7F	Zenith.	West.	Scintilla.	m-d B-L.	B-L.	m Spicer.	1/2 F Tim.	4.90
1900	1950			2750c	2850d	115	32x4	Own.	6-31x4	25.35	Franklin.....10	Own.	N.E.	A-K.	s-p B&B.	Own.	m Spicer.	1/2 F Own.	4.73
965	965		1065c	1115k	1365d	112	32x4	Lyc.	4-31x5 1/2	21.76	Gardner.....T-R & G	Cartier.	West.	West.	s-p B&B.	Mech.	m Mech.	1/2 F Flint.	4.80
490	490			685b	785d	100	30x3 1/2	Own.	4-31x4	21.03	Gray.....	Strom.	West.	West.	m-d Own.	Own.	m Mech.	1/2 F Tim.	3.90
				835d							H.C.S.....Series 4	Strom.	Delco.	Delco.	m-d B-L.	B-L.	m Spicer.	1/2 F Own.	4.45
2250	2250c			2850d	120	32x4 1/2	Weid.	4-31x5 1/2	22.50	H.C.S.....Series 6	Strom.	Delco.	Delco.	m-d B-L.	B-L.	m Spicer.	1/2 F Own.	4.45	
1350				115	32x4 1/2	Falls.	6-31x4 1/2	23.44			Handley.....6-40	Strom.	Bosch.	Bosch.	m-d Mech.	Mech.	m.	1/2 F Tim.	4.90
	1595	1595	1695c	2475c	2585d	125	32x4 1/2	Midw.	6-31x5 1/2	27.34	Handley.....6-60	Strom.	Bosch.	Bosch.	m-d Mech.	Mech.	m.	1/2 F Tim.	4.90
	1345	1345c		1950	1950	115	32 x	H-S.	4-31x5 1/2	19.60	Hanson.....66	Marvel.	Delco.	Delco.	s-p B&B.	G-L.	m Universal.	F Tim.	4.66
1775	1795	1975d		1975	2275	121	32x4	H-S.	4-31x5 1/2	25.35	Hatfield.....A-42	Zenith.	Dyneto.	Conn.	s-p B&B.	G-L.	m Spicer.	1/2 F Col.	4.66
2395	2550c	2395		3095	3395f	132	33x5	Own.	6-31x5 1/2	31.64	Hatfield.....55	Strom.	Bosch.	Bosch.	s-p B&B.	B-L.	m Spicer.	1/2 F Col.	4.66
		3250p		3395f							Haynes.....75	Strom.	L-N	Kingston.	m-d Warner.	Warner.	m Universal.	1/2 F Own.	4.60
1545	1595			2395p	2595	121	32x4 1/2	Own.	6-31x5	29.40	Haynes.....55	Rayfield.	L-N	Kingston.	m-d Warner.	Warner.	m Universal.	1/2 F Own.	4.41
1835p	1850			2895f							Holmes.....Series 4	Strom.	Dyneto.	Eisemann.	m-d B-L.	B-L.	m Peters.	1/2 F Tim.	4.90
	2500c	2500		3300c	3600f	126	34x4 1/2	Own.											

STANDARD OF THE WORLD



CONSIDERING the fact that more people purchase the Cadillac than all other cars combined selling at its price or higher, is it any wonder that the Cadillac Dealer values his franchise greatly?

CADILLAC

CADILLAC MOTOR CAR CO., DETROIT, MICH.
Division of General Motors Corporation

Specifications of Current Passenger Car Models

PRICES						Wheel Base	Tires	Engine Make	Cylinders: Bore and Stroke	Rated Horse Power (N.A.C.C.)	NAME AND MODEL	Carburetor	Starting and Lighting	Ignition	Clutch: Type and Make	Gearset	Universal: Type and Make	Rear Axle: Type and Make	Gear Ratio
2-Pass.	3-Pass.	7-Pass.	Sport	Coupe	Sedan														
3185a 3435c 900	3435e 3185c 925	3185	3385a	3385	4385f 4385e 1235 1235 1635f 6810f 9000f	136	32x4 1/2	Ow.	6-3 1/2 x 5 1/2	33.75	Marmen.....34	Strom.	Delco.	Delco.	m-d Own.	Own.	m Spicer.	3/4 F Own.	3.73
5400	4550g	5700	5000c	6720 6720c 6810f 9000f	6720c 6810f 9000f	109	31x4	Ow.	4-3 1/2 x 4 1/2	21.03	Maxwell.....	Stewart.	Remy.	Remy.	e Own.	Own.	f Own.	3/2 F Own.	4.60
3950b 3750c	3950c 3750e	3950e	3750c	4850 5250e 5000e 5000e	4850 5250e 5000e 5000e	140	33x5	Ow.	6-4 1/2 x 6	48.60	McFarlan.....1923	Rayfield.	West.	West.	m-d M&E.	B-L.	m Peters.	F Tim.	3.73
1895 1490b	1895 1590			4850 4700f	5250e 5000e	132	32x4 1/2	Ow.	4-3 1/2 x 6 1/2	22.50	Mercedes.....Series 5	Ball&B.	West.	Eisemann.	m-d Own.	Own.	m Spicer.	F Own.	3.87
				4700f	5000e	132	32x4 1/2	Ow.	6-3 1/2 x 5 1/2	33.75	Mercedes.....6	Strom.	Delco.	Eisemann.	m-d Own.	Own.	m Spicer.	3/4 F Own.	3.77
						119	32x4	Cont.	6-3 1/2 x 4 1/2	25.35	Merit.....	Strom.	Delco.	Delco.	s-p B&B.	Muncie.	f Snead.	F Col.	4.63
						120	32x4	Ow.	6-3 1/2 x 5	29.40	Mitchell.....F-50	Strom.	Remy.	Remy.	s-p B&B.	Own.	m Own.	F Own.	4.42
						127	32x4 1/2	Ow.	6-3 1/2 x 5	29.40	Mitchell.....F-50	Strom.	Remy.	Remy.	s-p B&B.	Own.	m Own.	F Own.	4.42
						115	31x4	Cont.	6-3 1/2 x 4 1/2	23.44	Moon.....6-40	Strom.	Delco.	Delco.	s-p B&B.	Warner.	m Spicer.	3/2 F Tim.	4.80
						128	33x4 1/2	Cont.	6-3 1/2 x 4 1/2	27.34	Moon.....6-58	Strom.	Delco.	Delco.	s-p B&B.	B-L.	m Spicer.	3/2 F Tim.	5.09
						121	33x4	Ow.	6-3 1/2 x 5	25.35	Nash.....691-3-6-7	Marvel.	Delco.	Delco.	s-p B&B.	Own.	m Own.	3/2 F Own.	4.50
						127	34x4 1/2	Ow.	6-3 1/2 x 5	25.35	Nash.....692-4-5	Marvel.	Delco.	Delco.	s-p B&B.	Own.	m Own.	3/2 F Own.	4.50
						112	33x4	Ow.	4-3 1/2 x 5	18.23	Nash.....41-4	Schebler.	Delco.	Delco.	s-p B&B.	Own.	m Own.	3/2 F Own.	4.88
2475b	2475e	2375f	2485d	3250f	3285f	130	32x4 1/2	Ow.	6-3 1/2 x 5 1/2	29.40	National.....6-71	Rayfield.	West.	Delco.	s-p B&B.	B-L.	m Universal.	F Col.	4.68
				3725e		121	32x4	Cont.	6-3 1/2 x 4 1/2	27.34	National.....6-51	Stromb.	A-L.	Own.	s-p B&B.	Covert.	m Universal.	3/4 F Salis.	4.50
				1785d	1885d	112	32x4	Ow.	6		National.....6-31	Stromb.	A-L.	Own.	s-p B&B.	Covert.	m Universal.	3/4 F Salis.	4.50
				1095d	1095d	121	32x4	Cont.	6-2 1/2 x 4 1/2	27.33	Nema.....4C	Zenith.	Delco.	Delco.	s-p B&B.	Detroit.	m Spicer.	3/2 F Tim.	4.45
				3500d	3325d	128	32x4 1/2	Ow.	6-3 1/2 x 4 1/2	18.99	Nema.....4C	Marvel.	Remy.	Remy.	e Own.	Muncie.	m Mech.	F Own.	4.33
				1515	1515	115	32x4	Ow.	6-2 1/2 x 4 1/2	18.99	Oakland.....6-44	Marvel.	Remy.	Remy.	e Own.	Muncie.	m Mech.	F Own.	4.33
				1185a	1185a	115	32x4	Ow.	4-3 1/2 x 5 1/2	21.80	Oldsmobile.....43 A	Zenith.	Delco.	Remy.	s-p B&B.	Muncie.	m Own.	3/4 F Own.	4.70
				1475	1595	115	32x4	Ow.	4-3 1/2 x 5 1/2	21.80	Oldsmobile.....43 A	Zenith.	Delco.	Remy.	s-p B&B.	Muncie.	m Own.	3/4 F Own.	4.70
				1195a	1195a	115	32x4	Ow.	4-3 1/2 x 5 1/2	21.80	Oldsmobile.....43 A	Zenith.	Delco.	Remy.	s-p B&B.	Muncie.	m Own.	3/4 F Own.	4.70
				2635f	2635f	123	33x4 1/2	Ow.	8-2 1/2 x 4 1/2	26.45	Oldsmobile.....46	Ball&B.	Delco.	Delco.	e Own.	Muncie.	m Spicer.	F Own.	4.50
				2025d	2025d	115	32x4	Ow.	8-2 1/2 x 4 1/2	26.45	Oldsmobile.....46	Ball&B.	Delco.	Delco.	e Own.	Muncie.	m Spicer.	F Own.	4.50
				860l	860l	100	30x3 1/2	Ow.	4-3 1/2 x 4	18.23	Overland.....91	Johnson.	Delco.	Delco.	s-p B&B.	Muncie.	m Own.	3/4 F Own.	5.10
				3325d	3325d	126	33x4 1/2	Ow.	6-3 1/2 x 5	27.34	Overland.....91	Johnson.	Delco.	Delco.	s-p B&B.	Muncie.	m Own.	3/4 F Own.	5.10
				3350d	3350d	126	33x4 1/2	Ow.	6-3 1/2 x 5	27.34	Packard.....126	Own.	A-K.	Delco.	m-d Own.	Own.	m Spicer.	3/2 F Own.	4.30
				3525f	3525f	133	33x4 1/2	Ow.	6-3 1/2 x 5	27.34	Packard.....133	Own.	A-K.	Delco.	m-d Own.	Own.	m Spicer.	3/2 F Own.	4.68
				3575f	3575f	136	35x5	Ow.	12-3 x 5	43.20	Packard.....335	Own.	Bijur.	Delco.	m-d Own.	Own.	m Spicer.	3/2 F Own.	4.38
				5240e	5400f	136	35x5	Ow.	12-3 x 5	43.20	Packard.....335	Own.	Bijur.	Delco.	m-d Own.	Own.	m Spicer.	3/2 F Own.	4.38
				3235d	3235d	131	33x4 1/2	Cont.	6-3 1/2 x 5	33.75	Paige.....6-70	Rayfield.	Remy.	A-K.	m-d Long.	Warner.	m Mech.	3/4 F Tim.	4.45
				3235f	3235f	131	33x4 1/2	Cont.	6-3 1/2 x 5	33.75	Paige.....6-70	Rayfield.	Remy.	A-K.	m-d Long.	Warner.	m Mech.	3/4 F Tim.	4.45
				2395	2395	120	32x4 1/2	Cont.	6-3 1/2 x 4 1/2	27.34	Peterson.....22-6-52	Strom.	Delco.	Delco.	s-p B&B.	Durston.	m Hartford.	3/2 F Std.	4.50
				3400a	3990d	128	33x5	Ow.	8-3 1/2 x 5	33.80	Peterson.....23	Ball&B.	Delco.	Delco.	m-d Own.	Own.	m Spicer.	3/4 F Tim.	4.90
				3550e	409 f	138	33x5	Ow.	6-4 x 5 1/2	38.40	Peterson.....23	Ball&B.	Delco.	Delco.	m-d Own.	Own.	m Spicer.	3/4 F Tim.	4.90
				6900	6900e	138	33x5	Ow.	6-4 x 5 1/2	38.40	Peterson.....23	Ball&B.	Delco.	Delco.	m-d Own.	Own.	m Spicer.	3/4 F Tim.	4.90
				1695	1695	126	32x4 1/2	H-S.	6-3 1/2 x 5	25.35	Pierce-Arrow.....	Own.	Delco.	Delco.	m-d Own.	Own.	m Spicer.	3/2 F Own.	4.29
				895	895	102	32x3 1/2	H-S.	4-3 1/2 x 4 1/2	14.40	Pierce-Arrow.....	Own.	Delco.	Delco.	m-d Own.	Own.	m Spicer.	3/2 F Own.	4.29
				4300	5100	126 1/2	32x4 1/2	Ow.	4-3 1/2 x 5 1/2	27.34	Pilot.....6-50	Till.	Bijur.	Conn.	s-p B&B.	Muncie.	m Hartford.	3/4 F Col.	4.33
				1750	1825	117	32x4	Ow.	4-3 1/2 x 4 1/2	23.44	Premier.....Strattan	Zenith.	A-L.	A-L.	Covert.	Covert.	m Spicer.	3/4 F	4.58
				3550f	3550f	128	32x4 1/2	Ow.	6-3 1/2 x 5 1/2	27.34	Premier.....6-D	Johnson.	Delco.	Delco.	s-p B-B.	Own.	m Spicer.	3/4 F	4.69
				3675f	3675f	123	32x4	Falls.	6-3 1/2 x 4 1/2	23.44	Premier.....6-D	Johnson.	Delco.	Delco.	s-p B-B.	Own.	m Spicer.	3/4 F	4.69
				2475d	2475d	116	32x4 1/2	Anst.	6-3 1/2 x 5 1/2	27.34	Premier.....6-D	Johnson.	Delco.	Delco.	s-p B-B.	Own.	m Spicer.	3/4 F	4.69
				3500d	3500d	124	32x4 1/2	Ow.	4-3 1/2 x 5	22.50	Premier.....6-D	Johnson.	Delco.	Delco.	s-p B-B.	Own.	m Spicer.	3/4 F	4.69
				3700f	3700f	124	32x4 1/2	Ow.	6-3 1/2 x 4 1/2	29.40	Princeton.....	Rayfield.	A-L.	A-L.	m-d Durant.	Muncie.	m Spicer.	3/2 F Dur.	5.12
				1885d	1885d	120	32x4	Ow.	6-3 1/2 x 5	24.34	Princeton.....	Rayfield.	A-L.	A-L.	m-d Durant.	Muncie.	m Spicer.	3/2 F Dur.	5.12
				1985d	1985d	117	32x4	Ow.	6-3 1/2 x 4 1/2	23.44	R & V Knight.....R	Strom.	Wagner.	Wagner.	s-p B&B.	B-L.	m Spicer.	3/2 F Salis.	4.75
				3585d	3585d	128	32x4 1/2	Cont.	4-3 1/2 x 6	28.90	R & V Knight.....H	Strom.	Wagner.	Wagner.	s-p B&B.	B-L.	m Spicer.	3/2 F Tim.	5.40
				4650e	4650e	128	32x4 1/2	Cont.	4-3 1/2 x 6	28.90	Rec.....T6	Rayfield.	N.E.	N.E.	m-d Own.	Own.	m f Own.	3/4 F Own.	4.70
				13150	12900	143 1/2	35x5	Ow.	6-4 1/2 x 4 1/2	48.60	Rickenbacker.....A	Strom.	Simms.	A-K.	s-p Own.	Warner.	m Universal.	3/4 F Col.	4.63
				5200e	5200e	118	32x4	Ow.	4-2 1/2 x 5 1/2	12.10	Rickenbacker.....A	Strom.	Simms.	A-K.	s-p Own.	Warner.	m Universal.	3/4 F Col.	4.63
				5250e	5250e	118	32x4	Ow.	4-2 1/2 x 5 1/2	12.10	Roamer.....6-54-E	Strom.	West.	Splitdorf.	s-p B-L.	B-L.	f Snead.	3/2 F Tim.	4.60
				2615	2615	118	33x4	Cont.	6-3 1/2 x 4 1/2	27.34	Roamer.....4-75-E	Strom.	West.	Splitdorf.	s-p B-L.	B-L.	f Snead.	3/2 F Tim.	4.60
				108	108	102	30x3 1/2	Lye.	4-3 1/2 x 5	19.60	Rolls-Royce.....40-50	Own.	Bijur.	Bosch.	e Own.	Own.	m Own.	F Own.	4.25
				112	112	108	31x4	Lye.	4-3 1/2 x 5	19.60	Rubay.....	Stromb.	Bosch.	Bosch.	s-p Own.	Own.	m Universal.	F Own.	5.10
				127	127	130	34x4 1/2	Ow.	8-3 1/2 x 5	33.80	Sayers Six.....DP	Strom.	Delco.	Delco.	s-p B&B.	G-L.	m Arvac.	3/2 F Std.	4.75
				3385d	3385d	130	32x4 1/2	Ow.	2-4 x 5		Seneca.....L-2 & O-2	Zenith.	A-L.	A-L.	s-p B&B.	G-L.	m Universal.	3/2 F Peru.	4.75
				3985f	3985f	130	32x4 1/2	Ow.	2-4 x 5		Seneca.....50 & 51	Zenith.	A-L.	A-L.	s-p B&B.	G-L.	m Universal.	3/2 F Peru.	4.75
				580	645	102	30x3 1/2	Cont.	4-3 1/2 x 4 1/2	15.63	Standard.....98	Zenith.	West.	Splitdorf.	s-p B&B.	G-L.	m Arvac.	3/2 F Own.	4.45
				3150e	3450f	125	34x4 1/2	Ow.	4-3 1/2 x 5 1/2	22.50	Stanley.....740	None.	Bijur.	None.	None.	None.	None.	3/2 F Own.	4.50
				3700f	3700f	130	34x4 1/2	Ow.	6-3 1/2 x 5	27.34	Star.....	Till.	A-L.	A-L.	s-p Own.	Warner.	m Spicer.	3/4 F Tim.	4.87
				4500f	4500f	125	34x4 1/2	Ow.	4-3 1/2 x 5 1/2	22.50	Stearns-Knight.....SK14	Rayfield.	West.	A-K.	m-d Own.	Own.	f Climax.	3/2 F Own.	4.50
				1895d	1895d	117	32x4	Ow.	6-3 1/2 x 4 1/2	25.35	Stearns-Knight.....6	Rayfield.	West.	A-K.	m-d Own.	Own.	f Climax.	3/2 F Own.	4.70
				1595d	1595d	117	32x4	Ow.	6-3 1/2 x 4 1/2	25.35	Stephens.....10	Stromb.	Delco.	Delco.	s-p B&B.	Mech.	m Mech.	3/2 F Tim.	4.66
				2385f	2385f	124	33x4 1/2	Ow.	6-3 1/2 x 4 1/2	25.35	Stephens.....20	Stromb.	Delco.	Delco.	s-p B&B.	Mech.	m Mech.	3/2 F Tim.	4.66
				1225b	1550d	112	31x4	Ow.	6-3 1/2 x 4 1/2	23.44	Studebaker.....Light Six	Strom.	Wag.Remy	Wag.Remy	s-p Own.	Own.	f Thermoid.	3/2 F Own.	4.33
				1875	2050	119													

MISCELLANEOUS

a-2 Passenger, d-5 Passenger,
b-3 Passenger, e-6 Passenger,
c-4 Passenger, f-7 Passenger

g-Chassis Price,
h-All Metal Type,
i-Soft Top Type,
n-Tire Size 32x4 1/2,
p-Sport.

†Price without starter and demountable rims. Price, complete, \$414.
*Price without starter and demountable rims. Price, complete, \$443.
†Standard Phaetons.

‡Brougham

Correction: Mitchell 2-passenger roadster, \$1590.

ENGINE

Anst-Ansted
Ben-Beaver
Cont-Continental
Dues-Duesenberg
H-S-Herschell-Spillman
Lyc-Lycoming

CARBURETOR

Ball & B-Ball & Ball
Till-Thillotson
Strom-Stromberg

STARTING, LIGHTING

IGNITION
A-L-Auto Lite
G-D-Gray & Davis
L-N-Leece Neville
N.E-North East
West-Westinghouse
Wag. Remy-Wagner Remy.

CLUTCH

c-Cone
m-d-Multiple disc
s-p-Single plate
B & B-Borg & Beck
B-L-Brown-Lipe

GEARSET

B-L-Brown-Lipe
G-L-Grant-Leece
Mech-Mechanics



Who'd Dare Say This?

"We supply inferior, or 'pirate', service parts on all repairs and replacements. *Genuine* parts would give you far better service but, under our plan, you'll have to come back lots quicker and have the job done again."—An imaginary dealer's conversation.

A STATEMENT like this would ruin any man's business.

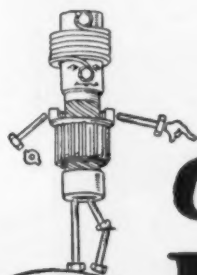
Yet, here and there, may be found a dealer or garage-man who *does* supply inferior or "pirate" parts. But *he doesn't admit it.*

Is something that he dares not tell his customers a good thing for his business? Will it make money in the long run?

Imitations never gave honest service or created good will. They give *poor* service and *destroy* good will. And success and profit in business are founded on honest service and good will!

None but a *genuine* service part can possibly give honest and satisfactory service in The Bendix Drive.

CAUTION: In our Bendix Drive advertisements, now appearing regularly each month in The Saturday Evening Post and The Literary Digest, the public is being cautioned to buy none but *genuine* service parts.



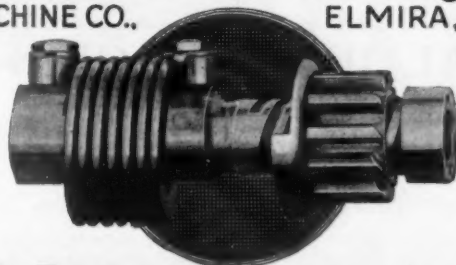
It pays to sell none but GENUINE PARTS FOR BENDIX DRIVE

ECLIPSE MACHINE CO.,

ELMIRA, NEW YORK

Detroit Office:
1342 Book Bldg.

Eclipse Machine Co., Limited
Walkerville, Ontario

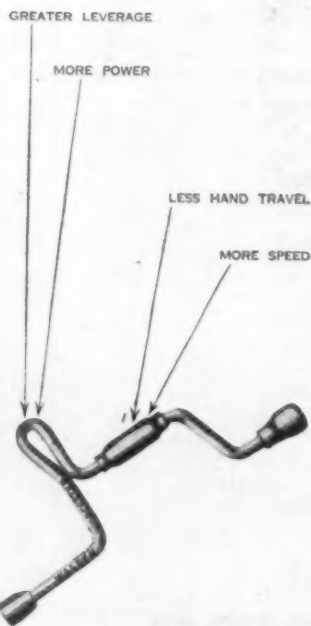


Standard Equipment on more than 90%
of the World's Automobiles and Trucks.

12,000,000 Registered Motor Vehicles
At Least 6,000,000 Potential Customers

for these

New Socket Wrenches for Demountable Rims and Disc Wheels



The loop on the handle is the grip for extra leverage in releasing and final tightening. The lesser throw on the brace gives more speed on account of lesser hand travel.

Our display boards have always proven good salesmen—this new board is the best ever offered.

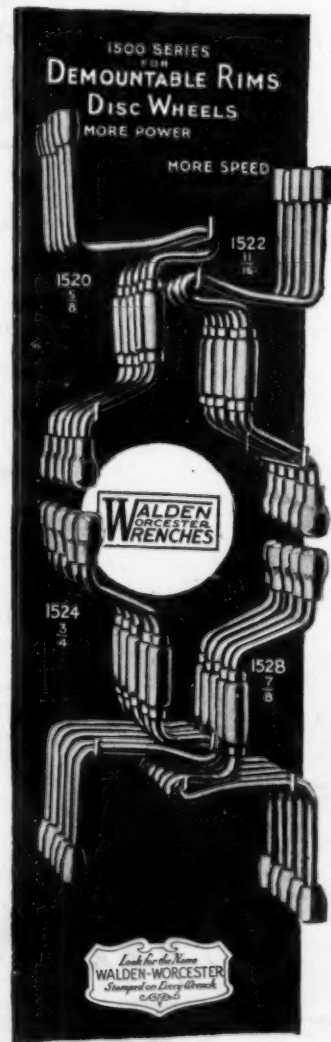
It contains five each of four standard sizes.

It takes up little space.
3' 9" x 1'.

It will hang on the wall or post.

The investment is small.

A big producer for the large or small dealer—equally profitable for the tire service station.



NO. 20 DISPLAY BOARD
(NEW)



WALDEN-WORCESTER
INCORPORATED
WORCESTER, MASSACHUSETTS



*There are particular Walden-Worcester Socket Wrenches
for particular parts of each particular car.*

Investigate/

The Sound Bumper Proposition

Aside from the fact that Biflex enjoys national consumer acceptance, it is built and backed by an organization that affords dealers exceptional advantages over unknown products of uncertain backing.

The Biflex organization knows the Bumper market. Just as Biflex was the pioneer in the bumper industry, it is today the pioneer in constantly and aggressively developing greater demand for Biflex Bumpers—building greater sales opportunities for Biflex dealers.

The Biflex selling plan protects Biflex dealers. It takes the risk out of the bumper business; it means not only SURE

bumper sales but big sales; worth-while profits.

There's no substitute for the Biflex Dealer Proposition. It's an exclusive proposition every dealer owes it to himself to investigate and clinch while the opportunity is offered.

Although we are continually enlarging manufacturing facilities to meet the demand for Biflex Bumpers, advance orders now indicate that demand will be in excess of production capacity during the coming season. Wise dealers are getting in on the Biflex proposition NOW. Write us for name of Biflex jobber in your territory.

BIFLEX PRODUCTS CO.

Waukegan, Ill.



TRADE MARK
Look for It



Biflex

Spring Bumper

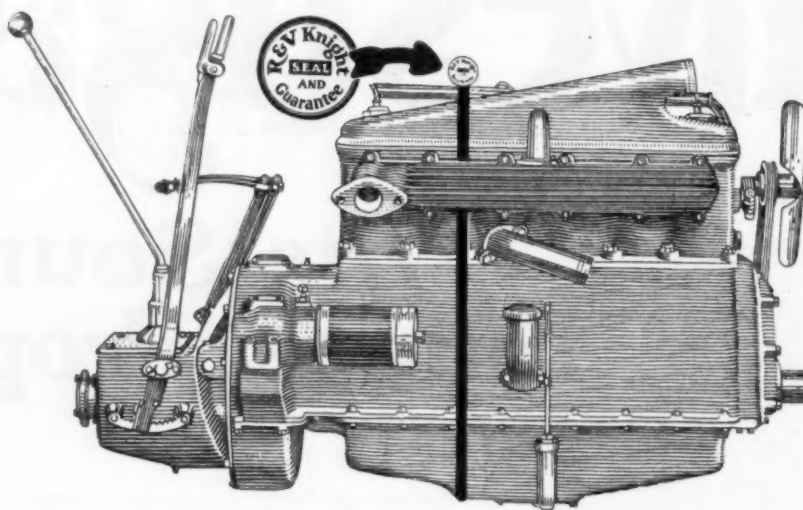
PROTECTION WITH DISTINCTION

National Automobile Shows

By H. A. HOLDER
President R & V Motor Company

**Sealed
and Guaranteed**

**for
2
years**



The largest automobile shows of the country have been held. It is now possible to judge their effects.

Some manufacturers question the large investment of time, effort and money put into them. But I cannot conscientiously feel in sympathy with ideas that point towards the discontinuance of these shows.

I am convinced that the open competition of these shows is the greatest possible stimulant and inspiration to the manufacturer who is honestly striving to serve the public better in his particular field.

All Knight motored cars show great development at shows

Naturally, I am prejudiced because our company specializes in Knight Motor cars. But discounting my own personal enthusiasm as much as possible, it seemed to me that Knight manufacturers as a whole showed progress and vitality much above the average. I believe the impartial observer—the open minded motorist—was impressed with this fact.

Knight manufacturers in the U. S. are few in number—there are only three of us. But we three are among the oldest automobile and gas engine manufacturers in this country. Knowing the poppet valve engine full well, from actual, practical manufacturing experience and use, we have shown our persistent faith in the Knight engine's greater possibilities by continued progress in designing and improvements.

Our faith and optimism in the Knight engine is justified and encouraged by the growing appreciation by the public of the value which the Knight engine gives. This appreciation was strikingly emphasized when value became the most important buying guide to careful motorists in 1920 and 1921. It was during this period, in my opinion, that Knight engines became firmly established in the minds of thinking buyers. This is shown by the relative sales gains in Knight-engined cars as compared with poppet-valve cars.

Knight engine's greatest endorsement

The Knight engine has received its greatest endorsement

for reliability, economy in operation and dependability by the decision of the interests behind the new Chicago Motor Bus Lines to adopt R&V Knight engines exclusively for their products. This company will be the largest bus operating company in America, besides being of the first importance as a motor bus manufacturer.

"Brass Tacks" facts alone influenced this decision. When profits are wholly dependent upon maintaining accurate schedules and cost of operation, the choice of an engine is of vital importance. Close study of R&V Knight performance over long periods of time furnished the proof that inevitably led to this choice. The experience of the Fifth Avenue Coach Company of New York which has used R&V Knight engines exclusively for many years has proved to the satisfaction of the Chicago operators the merits of our claims.

R&V Knight Six emphasizes value

The R & V Motor Company this year continued its unbroken representation of its product at the automobile shows. But never

and the R&V Motor Company

in its twenty years of show representation has it been so well satisfied with results as this year.

In advance the company realized that competition would be keener than ever in history. But it was not stampeded into the thought that the public idea of value could not get beyond first cost price. The company felt that the careful buyer wanted to buy real long time value — not just a price.

So instead of cutting cost of production in order to sell price, the company increased cost of production. It has of necessity increased price approximately 15%, but in so doing it is my conviction that it has increased value to the buyer at least 50%.

Manufacturers of any article can build to a price, and each can give for that price very nearly the same value as the other in labor, materials and performance. *Price, and price only, controls the product, if price is the controlling thought of the maker.*

Building the best all-around automobile ever produced

On the other hand, one may build for an ideal, to make the best all-around automobile ever produced. Into such construction

must go years of experience in designing, in construction, in quality, in workmanship, and in the selection of every detail which will give to the user the *one value* which is all values combined, namely: *Satisfaction with both the finished product and its necessary first price.*

That has been the one thought behind our new R&V Knight Six. Not one cent has been wasted on fads or fancies for selling appeal, and not one penny spared on essentials that our experience, as one of the oldest manufacturers of automobiles in the world, has taught us would give value in service. The result is, in my opinion, the best all-around automobile in America, because of the high development of our new R&V Knight engine.

Full support to the engine sealed and guaranteed for 2 years

This engine alone would uphold my claims if surrounded with ordinary units. But it does not stand alone.

No car, as a whole, received more attention from technical engineering experts, writing up exhibits at the big shows, than the R&V Knight Six.

All points of chassis and body construction can be seen and

appreciated by the motorist. They show what intelligent design and expenditure of money, keeping value, not first cost, in mind can accomplish.

The one thing that cannot be seen is the inside of our engine and the long life that is built into it. That long life is there. To prove it—to show our faith and sincerity—we have placed on the engine our sealed bond and this unusual guarantee. We guarantee that for full two years from date of purchase neither *user* nor *dealer* shall have one cent of renewal or repair expense on this engine, regardless of mileage run, except such repairs or renewals as are caused by neglect or collision.

Greater net profit to dealers

The remarkable guarantee on the R&V Knight Six permits a radical change in our selling plan. The gross profit is practically net profit to the dealer, as for him, at least, engine service cost is eliminated. He need not tie-up capital in stock—need not necessarily have a demonstrator.

This gives any live dealer, with his overhead expense paid by non-competitive cars, an unusual opportunity to sell a few R&V Knight Sixes each year and make a clean, clear, additional net profit with virtually no expense of time or effort. We will be glad to send you details of our unique selling plan. It costs nothing to find out. Just fill out and mail coupon today.

R&V MOTOR COMPANY East Moline, Illinois

R&V Knight Six

"EVERLASTING PERFORMANCE"

Branches:

Baltimore, Md., 1718-20 North Charles Street
Boston, Mass. - 872 Commonwealth Avenue
Chicago, Ill. - 2247 South Michigan Avenue
Cincinnati, Ohio - 813-817 Main Street
Cleveland, Ohio - 2122 Euclid Avenue
Kansas City, Mo., 1908-10 McGee Trafficway
New York City - 38-40 West 62nd Street
New Haven, Conn. - 71 Whitney Avenue

R&V MOTOR COMPANY, East Moline, Ill.

Gentlemen: Please send me full information on the R&V Knight Six engine, sealed and guaranteed for two years. Also send me your book, "Why We Believe in the Knight Engine." I am interested in the type car I have checked.

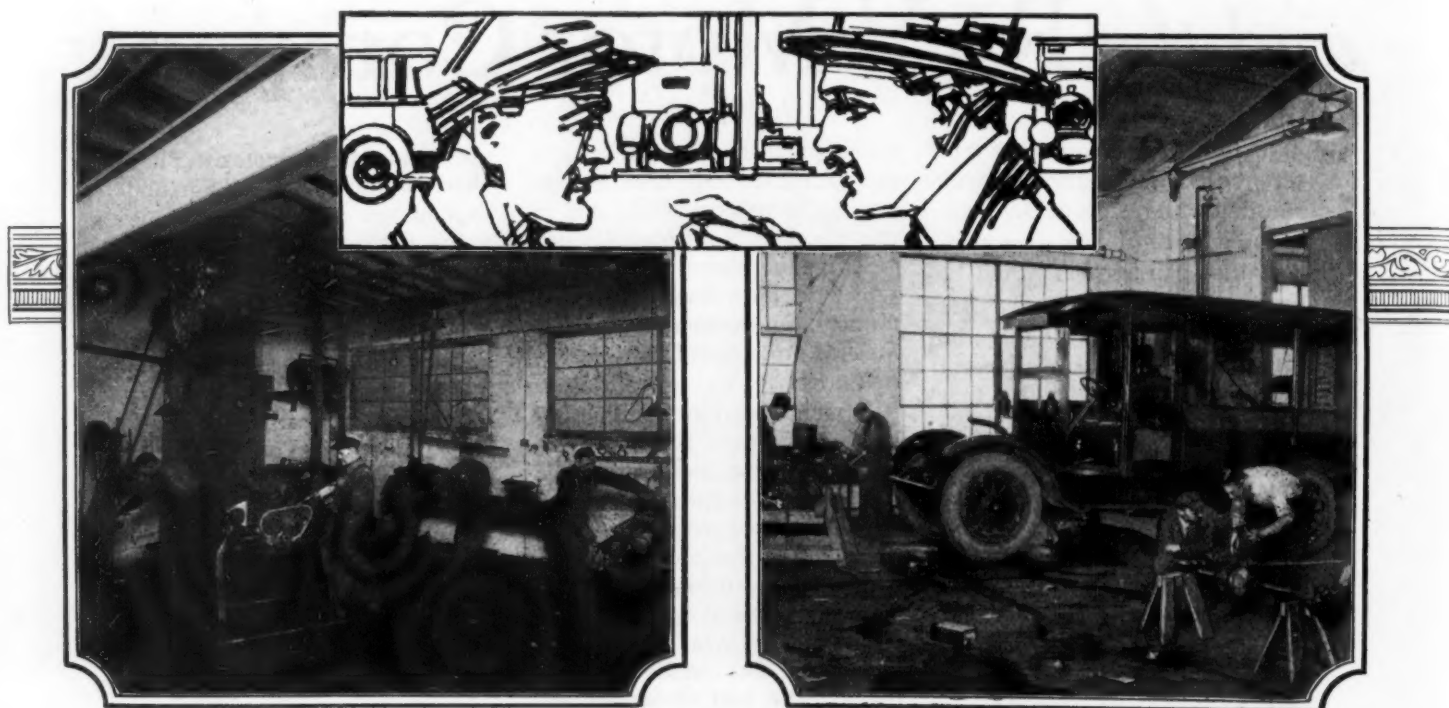
- ☐ Touring Car, (5 or 7 pass.) ☐ Club Sedan (5 pass.)
☐ Sportster (4 pass.) ☐ Sedan (7 pass.)

Signed

Address

City..... State..... M. A.

Mail
This
Request



How long will it take???

How much will it cost?

THOSE are two questions that every motorist asks when he brings in his car for service.

Will your answer satisfy him? Will the appearance of your shop support your promises? Can you truthfully promise him a first class job, with no delays, and at a reasonable price? Are you equipped to do what you claim?

Or will he see you substituting muscle for machinery—relying on slow, inaccurate hand work, instead of rapid mechanical precision—making him hesitate to give you the job, for

fear it will be poorly done, long overdue and excessively priced?

No shop will long survive that refuses to heed the widespread demand for quicker, more competent and more economical service. Proper equipment for *handling* the work, and proper machinery for *executing* it, are absolute essentials of successful shop practice. In no other way can it be done quickly, skilfully, at acceptable prices, and at a *real profit*.

If yours is that kind of shop, motorists will beat a path to your door.



Names Every Shop Man Should Know

ANY of the manufacturers listed below will help you in the selection of equipment best suited to conditions in your shop without obligating you in any way.

"Good Equipment Plus Knowledge Gives the Biggest Pay."
—Ambu.

Instruction in Automotive Electricity
Educational Division
The American Bureau of Engineering
Chicago, Ill.

Manufacturers of Battery Shop Equipment

Weidenhoff Products
4352-58 W. Roosevelt Rd.
Chicago, Ill.

Electrical Testing Devices
Test Benches
Battery Dischargers
Growlers
Magnetizers
Variable Speed Motors
Generator Holding Vises and Driving Chucks
Mica Undercutters

Continental Auto Parts Company
Columbus, Ind.

Motor Overhauling, Radiator and Axle Stands
Piston Vises, Gear Pullers
Creepers
Wrecking Trucks
Straightening Presses
Piston Aligning Devices
Burning-in Machines

Wright Mfg. Co.
Lisbon, Ohio

Wright High-Speed Chain Hoists
Standard Screw Chain Hoists
Differential Chain Hoists
Steel Trolleys for Overhead Track Systems
Hand Traveling Cranes

The Manley Mfg. Co.
York, Pa.

Cranes—Wrecking and Floor Presses—Garage and Arbor Auto Hoists, Garage Lights
Garage and Service Jacks
Towing Trucks
Engine and Axle Stands
Portable Benches
Portable Tool Trays

Air and Water Stations
Truck Wheel Handler
Chassis Underworker

The Burton-Rogers Company
755 Boylston Street
Boston, Mass.

Hoyt Electrical Instruments
Ammeters
Volt Meters
Rotary Meters
Growler Sets
Magneto Testers
Cadmium Meters
Cell Meters
Mohawk Rectifiers

Weaver Mfg. Co.
Springfield, Ill.

Auto Hoists, Axle Stands
Arbor Presses, Jacks
Ambulances
Tire Changers
Tire Spreaders
Wire Wheel Repair Stands
Bucket Pumps
Gasoline Cans

Mid-West Manufacturing Co.
Minneapolis, Minn.

Red Devil Dolly Jacks
Tire Changing Jacks
Adjustable Garage Horses
Garage Cranes and Ambulances
Burnishing Machines and Burnishing Compounds

T. R. Almond Mfg. Co.
Ashburnham, Mass.

Drill Chucks
Lathe Chucks
Micrometers, Outside
Micrometers, Inside, for Cylinder Measurements

Oxweld Acetylene Co.
Newark, Chicago,
San Francisco

Oxy-Acetylene Apparatus and Supplies
Ever-Ready Welding, Cutting and Lead-Burning Outfits

Frank Mossberg Company
Lamb St.
Attleboro, Mass.

Wrenchsmiths for 20 Years
Solid Socket Wrenches
"Tee" Handles
Speeders, "Swivel Joint"
"Tee" Handles and Speeders
Special Wrenches and Tools for Fords
Miscellaneous Automobile Tools
Socket Wrench Sets and Accessories
Engineers' Wrenches
Adjustable Wrenches
Metal Stampings

The Jacobs Manufacturing Company
Hartford, Conn.
Drill Chucks

Stevens & Company
375 Broadway
New York

Stevens "SPEED-UP" Tools
Piston Aligner
Microgauge
Piston Vise
Valve Reseaters and Refacers
90 Special Tools for Ford and Fordson
Sectional Cabinets

Kellogg Manufacturing Company
Rochester, N. Y.

Kellogg Electric Motor Driven Garage Compressors
Kellogg Air Towers
Kellogg Valves
Kellogg Gauges

Bonney Forge & Tool Works
Allentown, Pa.

Original Chrome-Vanadium Drop Forged Wrenches
Original Chrome-Vanadium Valve Tappet Wrenches
Carbon Steel Drop Forged Wrenches of all kinds
Stillson Pipe Wrenches
Adjustable Wrenches
Combination Wrenches
Garage and Small Vises
Battery and Grease Cup Pliers
Body Iron Assortments
Special Automobile Tools
Drop Forgings

The Black & Decker Mfg. Co.
Baltimore, Md.

Portable Electric Drills
Electric Air Compressors
Electric Portable and Bench Grinders
Electric Valve Grinders
Bench Drill Stands

This advertisement is published and paid for by the concerns listed above who are pioneers in the development of time and labor-saving equipment for automotive service work.

These concerns are co-operating with all automotive service men, and you are cordially invited to write to any of them for information and advice regarding the class of equipment shown below their names.

SERVICE EQUIPMENT ASSOCIATES



"The Best-Equipped Shop Gets the Business"

L. LAWRENCE & CO.
 MAIN OFFICE
 WILMINGTON BUILDING, NEW YORK.
 Newark, N. J., April 20th, 1922.
 Landis Tool Company,
 Waynesboro, Pennsylvania.
 Gentlemen:-
 Regarding the No. 5, Landis Cylinder Grinders, which we have had at our plant for the past six months.
 We wish to advise that the work that we have turned out with these machines, has been finished perfectly and carefully. In fact, the work has been done so smoothly, that we have been commented on the ease of work turned out on these grinders. Therefore, we feel and desire to comment you on the perfect operation of these machines.
 We think this is due in view of the fact of the success that we have had, both on quality and the quantity of the cylinders that we have been able to grind. Being well pleased with the machines, we are willing to recommend them to anyone.
 These machines take up less floor space than most machines and are perfect in operation.
 We also wish to thank you for the excellent service that you have rendered us in getting these machines set up and into operation.
 Trusting we will be in a position to place another grinder in a short time, we beg to remain
 Very truly yours,
 L. LAWRENCE & COMPANY
 For J. Lawrence
 President

LL:HB

YOUNG MACHINE COMPANY, INC.
 505 WEST STATE STREET
 ROCKFORD, ILLINOIS
 MANUFACTURERS OF
 MOTOR PARTS
 Dec. 10, 1922
 The Landis Tool Company,
 Waynesboro, Pa.
 Gentlemen:-
 In reply to your letter of December 15th, 1922, we will advise that our Cylinder Grinding Machine has been giving very satisfactory results.
 Due to the accuracy and finish of cylinders obtained by this machine, we have been able to turn out our business over 50 percent.
 Hoping this will answer your letter, we remain
 Yours very truly,
 Young Machine Company.
 President.
 W. R. Young

ALLEN & ALLEN MACHINE CO.
 MACHINISTS, BLACKSMITHS AND
 ACETYLENE WELDERS
 HALESBURN, N. C. Dec. 19, 1922.
 Landis Tool Co.,
 Waynesboro, Pa.
 Gentlemen:-
 In reply to your letter of Dec. 15 regarding cylinder grinding machine, we wish to state that this machine is giving entire satisfaction and we are highly pleased with its performance.
 We feel safe to say that every cylinder ground with the Landis grinder is a perfect job as far as the machine's ability is concerned and our results as we think, could not be improved.
 We wish to congratulate the L. T. Co. for building a machine which measures up to the highest standard of machine efficiency.
 Wishing you a Merry Xmas and better business in the coming year
 we are
 Yours Very Truly
 Allen & Allen Machine Co.
 H. B. Allen

What Users Say—

LANDIS TOOL COMPANY, Waynesboro, Pa.

New York Office: 51 Chambers St.

DOMESTIC AGENTS—Hallidie Machinery Co., Seattle; Smith, Booth, Usher Co., San Francisco and Los Angeles; Southern Machinery Sales Co., Houston; Fulton Supply Co., Atlanta; F. C. Richmond Machinery Co., Salt Lake City.
CANADIAN AGENTS—F. F. Barber Machinery Co., Toronto; Williams & Wilson, Ltd., Montreal; A. R. Williams Machinery Co., Nova Scotia, New Brunswick, Manitoba and British Columbia.

FOREIGN AGENTS—Allied Machinery Co., Paris, Turin, Barcelona, Brussels, Zurich and Lisbon; Anderson, Meyer & Co., Ltd., Shanghai; Andrews & George Co., Ltd., Tokyo; Benson Brothers, Sydney and Melbourne; Burton, Griffiths & Co., Ltd., London; Wilh. Sonesson & Co., Malmö and Copenhagen.

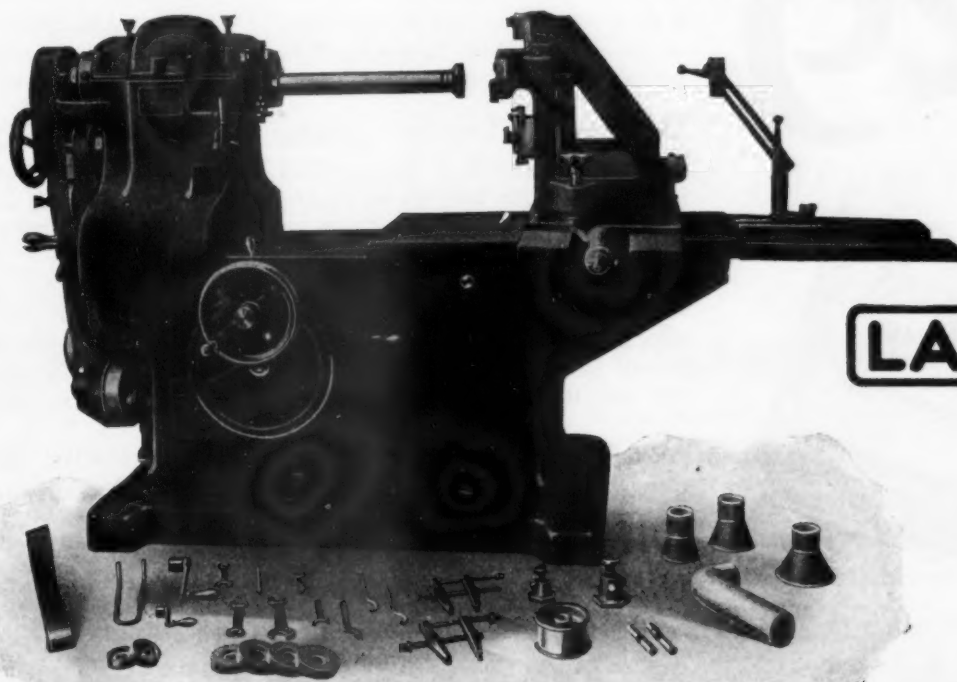


Here are a few of the letters we receive from purchasers of our No. 5 Cylinder Grinding Machine. What more need be said?

The machine is readily adaptable at all times to the grinding of different types of cylinder blocs. Not on accu-

racy alone does it depend, but upon its ability to produce the finished bloc in a minimum amount of time. The Work Centering Bar eliminates all unnecessary waste of time when changing from one job to another. Time is worth money to you.

Ask for further details.



LANDIS



MULTIBESTOS 229 LINING for Ford Transmissions

"229"



Almost a year ago, we set out to develop this new type of Ford transmission lining. We saw big room for improvement in Ford transmission linings then on the market.

We felt a lining could be developed which would give, 1st, longer life; 2nd, smoother operation with less chatter; 3rd, effective resistance to the heated transmission oil in which the lining must operate.

We experimented tirelessly in our search for a new and better type of lining. We offer you the fruit of our efforts in Multibestos 229, a Ford transmission lining which we believe is superior to anything you have ever before used or seen!

We have called this product Multibestos "229" because the fabric is composed of 229 strands of 4-ply yarn, insuring strength, toughness and long wear. Even though it is closely woven, Multibestos 229 is very pliable. Hence it reduces chatter and works like velvet.

Multibestos 229 is specially treated so it will effectively resist the glazing effect of hot transmission oil. It will satisfy your customers and bring you increased sales. You can sell it with the absolute assurance it will perform *right*!

We will gladly send you full facts about this new and better Ford transmission lining. Write today.

Multibestos Company
Walpole, Mass., U. S. A.

All the Wrench Equipment You Need In One Small Box



Sockets are strong, cold drawn (Allen process) and specially heat treated.



THE H & G Universal Set comes complete — Sockets, Adjustable T Handle, Ratchet, Universal Joint, Extension Piece, Screw Drivers and Box Wrench—everything you need to handle 95% of the repair jobs that come in.

Where You Want 'em When You Want 'em

The H & G Socket Wrench Set comes packed in a hardwood box 12" long x 8" wide x 2 $\frac{3}{4}$ " deep, small enough for the mechanic to keep right beside him on the job without being in the way. Each part is in a separate compartment ready to his hand. And the handiest place to put a part when he is through with it is back where it belongs. No more hunting about the shop for a missing wrench while the job waits.

Saves Money, Too

An H & G Socket Wrench set saves money in two ways. It cuts down labor cost by enabling the mechanic to do the job quicker; and it saves the cost of a lot of individual wrenches.

Two Sets

The Universal Set illustrated and a smaller set especially designed for Ford car owners and repairers.

H & G Speed Wrench

A handy addition to an H & G Socket Wrench set. Fits all sockets, ratchet, universal joint and screw drivers, and is adaptable to a hundred jobs.

Ask Your Dealer or Jobber

for H & G Socket Wrench Sets. If he cannot supply you, give us his name and we will see that you are taken care of.

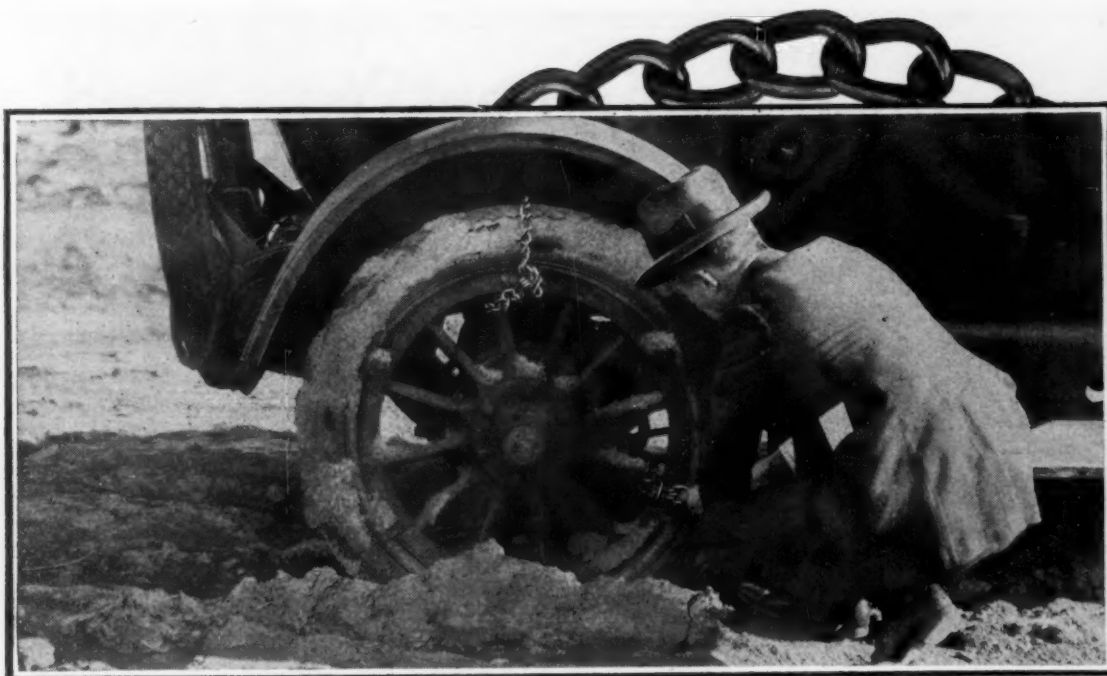
Jobbers and Dealers: There are hundreds of thousands of car owners and repairmen who will buy a good socket wrench set. The H & G is a good set. Write for literature, prices and discounts.

THE EASTERN MACHINE SCREW CORP.

10-20 Barclay St.

New Haven, Conn.

SOCKET H&G WRENCH



Another MCKAY Chain— The MCKAY Shurout

Out of the mud in a jiffy. Put the Shurout around the spoke, through the ring and over the tire, buckle it, and you're ready to go.

An emergency chain to provide traction and get cars and trucks out of mud or sand. It's made of heavy, tough steel, and can be applied in a moment, without a jack or other tools. As easy as buckling your belt.

Every motorist and truck-operator is a prospect for Shurouts. Because they'll provide traction anywhere, these chains make driving *certain*. They come in sets of four, in the McKay red band bag.

They meet the emergency.

Tow chain—They can be buckled together and used in series as a tow chain.

Spare tire safeguard—A Shurout can be wound around a spare tire and the tire carrier, and secured with a padlock.

For temporary repair—Broken springs can be held in place until permanently repaired by wrapping and buckling a Shurout Chain around the broken part.

For an extra spare—If a tire carrier is made to carry but one spare and the motorist wants to carry a second, a set of four Shurouts will hold it in place.

Emergency chains—Shurouts can be effectively used in an emergency to safeguard trucks on wet or icy pavements.

A display feature is provided for your window or counter. It tells the story of these remarkable chains and will sell them for you. Ask your jobber about McKay Shurout Chains, or write us.

UNITED STATES CHAIN & FORGING CO., Union Arcade, Pittsburgh, Pa.
Makers of McKay Tire Chains and chains for all commercial and industrial purposes
Plants at York and McKees Rocks, Pa.; Columbus and Marietta, O.; Huntington, W. Va.

MCKAY SHUROUT CHAINS

MCK



Credit Yourself With Another Solid Customer



Get this Handy Bearing Guide
Save time with this handy booklet listing cars, trucks and tractors with bearing stock numbers of each. Sent gladly, with the name of our nearest distributor. No obligation.

"WALT, if Smith doesn't faint dead away when we tell him his 'groaner' is ready a whole day before he expects it, I'll miss my guess!"

"Sure beats the dickens how those 'Milwaukee' distributors snap into it when we wire for Milwaukee Bearings. Never saw such pep in my life! Do you realize that twelve hours after this old chariot clattered in we were unwrapping a new set of bearings?"

"I sure do, Jerry, and take it from me, those are bearings — as fine as I ever scraped in!"

* * * *

Nothing will tie a customer closer to you than a bit of unusual, snappy, unexpected service on a bearing job.

You can make it a regular feature of your shop with "Milwaukees". Service on these great bearings is never more than a day away — no matter where you are. There's real profit in them, too—more than you think.

MILWAUKEE DIE CASTING COMPANY
MILWAUKEE WISCONSIN

MILWAUKEE BEARINGS

Customers Say, "I Want a Red-Top"

The ease of sale with Fisk Red-Tops is of vast importance, but greater than this is the ability shown by the Red-Top to build permanent business.

The letter from the Kilbourn Tire Shop of Kilbourn, Wisconsin, is characteristic of the attitude of dealers who have had experience in selling these tires:

"The Red-Top with its oversize, its quality, heavy tread and good looks, is easily the fastest selling and easiest sold tire I have on my shelves.

"My customers come into the shop already sold on a Red-Top through past experience or word of mouth advertising. They do not have to be talked into buying but generally say, 'I want a Red-Top.'

"Red-Tops are giving better mileage and better satisfaction than any other tire sold in this territory and it sure gives me a satisfied feeling under my belt to know that once I have sold a man on Red-Tops that he is going to stay sold, come in and get another, and is going to sell his friends."

It doesn't take much of an investment to find out for yourself just what Fisk Red-Tops will do for any business. Many dealers have started with two or three Red-Tops who have built a big trade with them and have found its sale will increase business with their full line of tires. Write us if you are interested in the Fisk Franchise which includes this non-competitive business-building tire.

There's a Fisk Tire of extra value for every car, truck or speed wagon

THE FISK TIRE COMPANY, Inc.

Chicopee Falls, Mass.

Extra Ply of Fabric—Extra Heavy Tread



This Man Spracklen Is Right!

We Repair Men Know by Experience

*Get Wise
to What He Says*



**A. A. SPRACKLEN
GARAGE**
AUTOMOBILE ACCESSORIES. OILS AND SUPPLIES
ALL KINDS OF AUTOMOBILE REPAIR WORK

LAKEWOOD, ILL. *June 28* 1922

*Pep Mfg. Co.,
New York City,
Gentlemen:*

*I wish to say that your
Pep Valve Grinding Compound has
sure made a hit with me.
I would just as soon try running
a Garage without any tools as without
Pep, there would be about as much
sense to it.*

*I never knew what a good Valve
Seat was until I used Pep and it
does it in half the time.*

*Yours respectfully,
A. A. Spracklen*

If that's not enough for you on

PEP

WATER MIXED VALVE GRINDING COMPOUND

Prove It at Our Expense

Also Pep Babbitt Bearing Grinding Compound

Check free sample wanted
Pep Mfg. Co., Inc., 33 W. 42nd St., N. Y.
Pep Valve Compound
Pep Bearing Compound
Write name and
address in margin
MA-3

Engine "warms up" during freezing weather in $\frac{1}{4}$ usual time

Remarkable tests at the Indianapolis Motor Speedway, under auspices of American Automobile Association (Official Sanction No. 1369), prove conclusively that the Bishop-Babcock Aquastat delivers summer engine efficiency under winter driving conditions, with a considerable saving in fuel—statement of Chester S. Ricker, A. A. A. official observer



The Stutz Six which was used in the tests with Harold Lehman, assistant chief engineer, and Earl Jacks, experimental engineer, of the Stutz Motor Car Company, "Howdy" Wilcox, driver, and Chester S. Ricker, official observer.



Illustrative of the care and accuracy which was maintained throughout the tests in this photograph of Chester S. Ricker, A. A. A. official observer, weighing the gasoline used. "Howdy" Wilcox, winner of the 1919 International Sweepstakes at Indianapolis, who drove the cars in the tests.



This Studebaker Big Six, owned by the Don Herr Cab Company of Indianapolis, was used in the tests. Illustration shows "Howdy" Wilcox, driver, and Chester S. Ricker, official observer.

"The results of the official A. A. A. tests, made under Official Sanction No. 1369, with your Aquastats at the Indianapolis Motor Speedway today (Jan. 23, 1923) should be gratifying to you and also very edifying to motor car users and manufacturers," writes Chester S. Ricker, official observer, to The Bishop & Babcock Company.

"Very similar results were obtained on both the Studebaker Big Six and the new Stutz Six which were used during these tests.

"Both cars were operated with and without the Bishop-Babcock Aquastat under typical winter conditions, the mercury, hovering around the freezing point throughout each of the ten-mile test runs.

"The Stutz test runs were made to simulate coun-

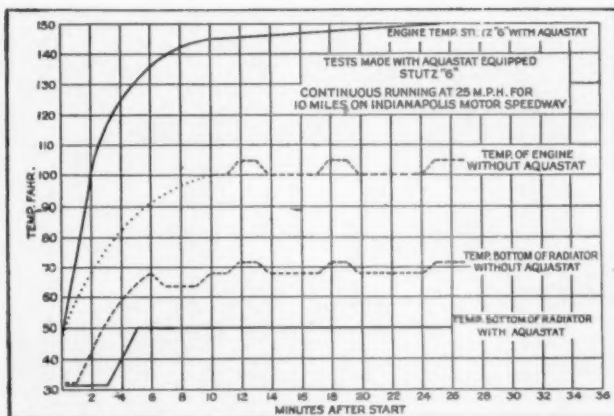
try driving and a constant speed of 25 miles per hour was maintained. The Studebaker test was made to simulate city driving and a full stop was made every half mile, and a speed of about 25 miles per hour made between stops.

Smoother operation noted

"The rapid warming up of the engines when equipped with the Bishop-Babcock Aquastat and the accompany smoother operation were the most noticeable features brought out by these tests.

"The increase in mileage due to the application of the Bishop-Babcock Aquastat was particularly noticeable on the Studebaker, where the car had to be accelerated to 25 miles per hour every half

Summer Performance ALL THE YEAR



In test runs with the Stutz Six, the approximate operating temperature of the engine was 147 degrees with the Aquastat, and slightly less than 140 degrees without it. With the Aquastat, the Stutz "warmed up" in slightly less than 3 minutes; without it, 12 minutes were required.

mile. This was shown by the 11.1 per cent saving in fuel obtained."

"Howdy" Wilcox' Statement

Somewhat similar comments were made by "Howdy" Wilcox, internationally known racing driver, who drove the cars during all the tests. Mr. Wilcox writes:

"You will no doubt be interested to know the result of the test conducted on the Indianapolis Motor Speedway today with the Studebaker Big Six, which was equipped with your Aquastat.

"Although the temperature was 3 degrees below freezing (28 degrees F.), there was no tendency whatever to freeze the radiator on account of the 10 per cent seepage provided in your Aquastat. The Aquastat controlled the engine temperature very closely and provided in reality summer operating conditions.

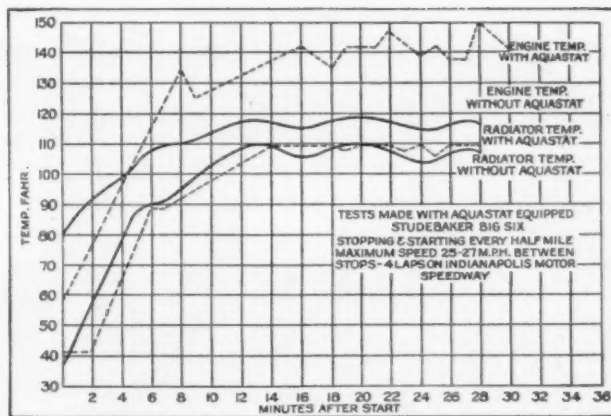
Lubrication and carburetion improved

"The all around performance of the motor was wonderfully improved, especially noticeable in the improvement of lubrication and carburetion."

Study the diagrams at the top of the page in connection with these statements by Mr. Ricker and Mr. Wilcox. We guarantee similar results on all cars and trucks having pump-operated cooling systems. We will gladly supply samples, without charge, to manufacturers and dealers who wish to test the Bishop-Babcock Aquastat.

THE BISHOP & BABCOCK COMPANY,
Cleveland, Ohio

Automotive Specialties Division



In "stop and start" test runs with the Studebaker Big Six, the approximate operating temperature of the engine was 140 degrees with the Aquastat, and 135 degrees without it. With the Aquastat, the Studebaker delivered 13 miles per gallon of fuel (note that this was a test to simulate city driving); without, 11.7 miles per gallon—an increase in mileage of 11.1 per cent in favor of the Aquastat.

Note that in both tests, one with the Stutz valve-in-head motor and the other with the Studebaker "L" head motor, the charts show the same relative temperature performance with the Aquastat.

What the Bishop-Babcock Aquastat is — and does

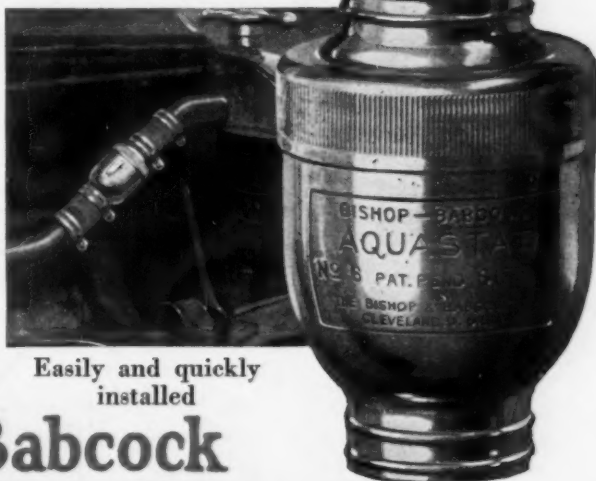
The Bishop-Babcock Aquastat provides automatic, thermostatic control of the water cooling systems of all pump-operated cars and trucks. It delivers summer engine efficiency at winter temperatures—summer performances all the year.

Repeated and long-continued tests have definitely established these benefits resulting from the Bishop-Babcock Aquastat:

- adjusts the water cooling system to seasonal requirements.
- maintains constant temperature in the water surrounding the combustion chamber and cylinders.
- prevents over-cooling of engine in cold weather.
- warms up engine quickly in cold weather and reduces use of choke.
- saves fuel by preventing recondensation and by permitting use of less gas.
- reduces carbon deposits from excess oil.
- prevents diluting of oil in crankcase by excess gasoline.
- allows a 10% seepage at all times to check danger of freezing.

The Bishop-Babcock Aquastat is guaranteed by The Bishop & Babcock Company of Cleveland, Ohio, manufacturers of the "world's most complete line of heating specialties."

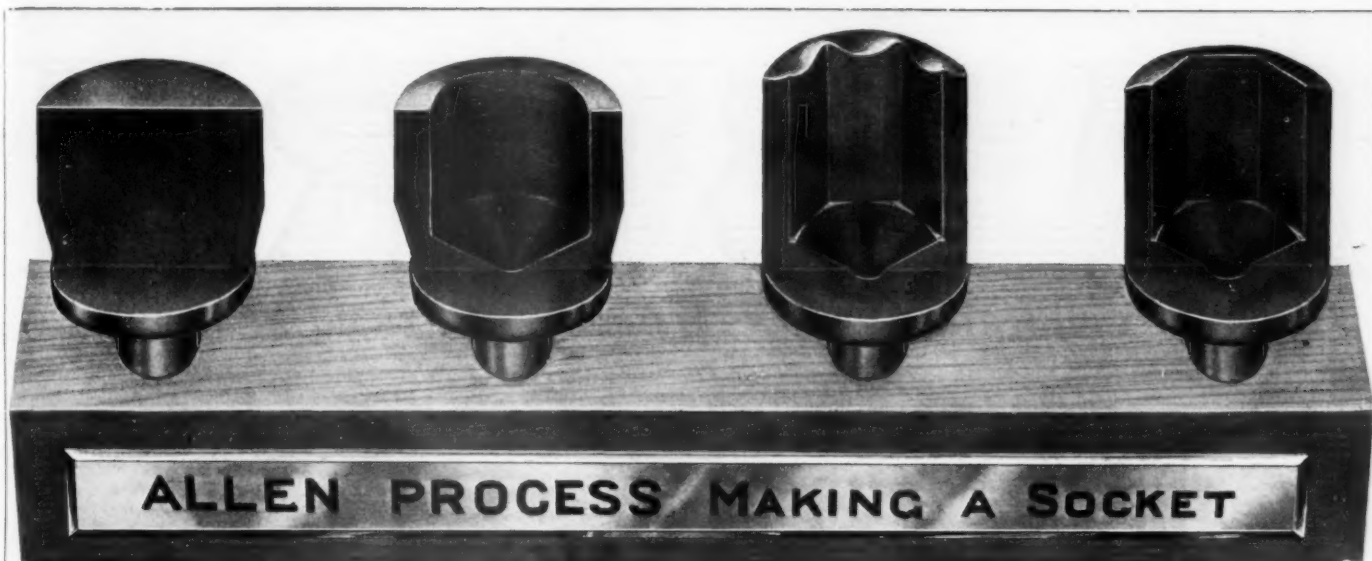
Retail Price \$10.00



Easily and quickly
installed

Bishop-Babcock AQUASTAT

Two hose sizes
1 1/4" and 1 1/2"



This shows the steps in making sockets for Bay State Wrench Sets. First, the solid "blank" of special analysis steel. Then the drilled-out socket, with the extra thickness of stock in the socket-wall. Next, the socket cold-drawn to the finished size; driven through a die by a solid hexagon punch; tremendously compressed and given 30% **increased strength**. Finally the finished article, finely machined and scientifically heat-treated. . . . The result is a socket **unbreakable in use** and so guaranteed. The **ONLY** cold-drawn socket; all others are broached the ordinary way and have only ordinary strength.

BAY STATE WRENCH SETS



At left: Box Set No. 10, with 9 hex. and 3 square sockets; reversible ratchet or solid wrench; universal joint; long and short extension bars; offset wrench. Price, \$10.00 (list).

At right: Bag Set No. 21-1, with 8 hex. sockets; reversible ratchet wrench; universal joint; extension bar; bent bar; removable adapter; strong, serviceable bag. Price, \$7.00 (list).



BAY STATE (Allen) Wrench Sets come in combination covering every requirement of mechanics, car owners, millwrights and **all** who have need of unbreakable tools, so guaranteed. Box Sets and Bag Sets—two of the most popular illustrated above. The Bay State booklet, picturing and pricing the complete line, is a mighty handy little wrench reference-book—sent if you'll ask.

THE ALLEN MFG. COMPANY . . . 135 Sheldon Street
HARTFORD, CONN.

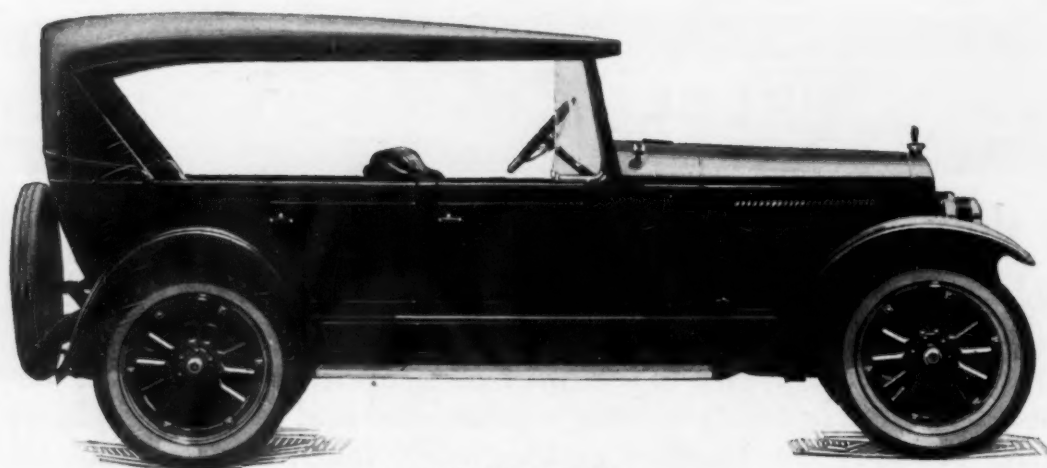
Manufacturers of Safety Set Screws, Socket Head Cap Screws, Pipe Plugs, Tap Extensions and Socket Wrenches—Allen Process
Pacific Coast Branch Office: The Charles A. Dowd Sales Co., 320 Market Street, San Francisco, Cal.

Distributors:

The Johnson Sales Co. 1429 Candler Bldg. Atlanta, Ga.	J. V. McDowell, 6230 Ellis Ave., Chicago, Ill.	Chas. A. Dowd Sales Co. 320 Market Street, San Francisco, Cal.	Johnson Sales Co., 3108 Brooklyn Ave., Kansas City, Mo.	The Rathbun Co., El Paso, Texas	Western Auto Supply Co., Los Angeles, Cal. (61 Stores)
---	--	--	---	---------------------------------------	--

AUBURN

"Once an Owner—Always a Friend"



6-63 Touring Car

One distributor signs 20 new dealers in two weeks

THERE'S pep and go and confidence behind the complete Auburn line of sixes this year.

In two weeks after we announced our plans for 1923 one of our distributors signed up 20 new dealers.

They liked the new 6-43 Auburn to sell for \$1095.

They liked our wonderful new 70-mile-an-hour-car — the Six Supreme with its astonishing new Auburn motor.

They liked our plan for big volume national advertising, and strong support in dealers' own territory.

They liked the liberal provisions of the permanent franchise drawn to make real dealer profits.

They grabbed while the grabbing was good — and they got something!

You may have the chance to do the same thing today and you won't regret it! Write or wire now!

AUBURN AUTOMOBILE COMPANY
Auburn, Ind.



AUBURN

"Once an Owner—Always a Friend"



6-43 Touring Car

Here are the new cars and the complete line that did it!

6-43	5-Passenger Touring	\$1095.00
6-43	Touring Sedan	1465.00
6-51	5-Passenger Touring	1275.00
6-51	7-Passenger Touring	1345.00
6-63	5-Passenger Touring	1650.00
6-51	Sport (fully equipped)	1895.00
6-51	Brougham	1965.00
6-51	5-Passenger Sedan (including two extra seats)	2245.00

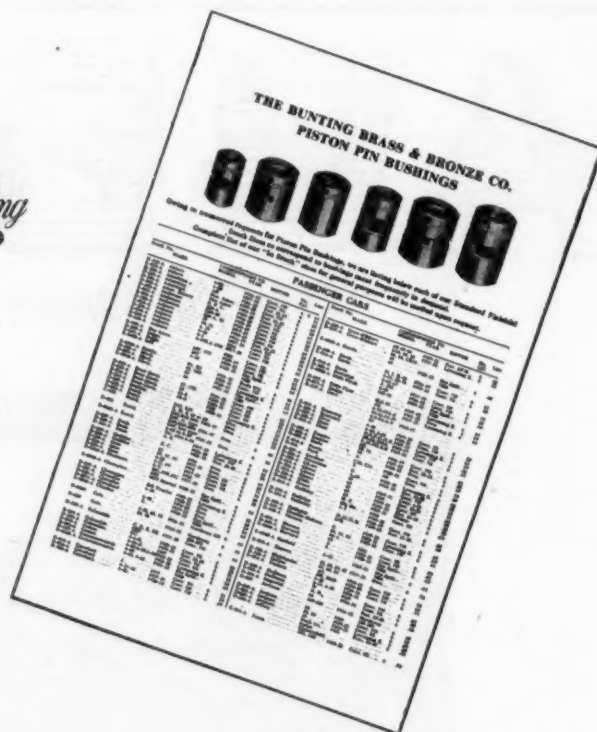
(Freight and War Tax Extra)

Should not you have a line like the above to make the most of 1923?



Miniature reproduction of full page advertisement in The Saturday Evening Post, February 3.





Announcing

A New Complete Line of Bunting Spring Bolt Bushings

Genuine Bunting Spring bolt bushings for all popular automotive vehicles are now available from stocks constantly carried by auto parts jobbers and at the Bunting factory and the Bunting branches in New York, Chicago, Cleveland, Boston and San Francisco.

This new and complete line of Spring bolt bushings practically doubles the opportunity of the automobile builder, the auto parts job-

ber and the service man to enhance his profit and his reputation by the application of genuine Bunting Phosphor Bronze automotive bushings.

Write for List No. 111 giving description and prices of Bunting's "Ready Made" Spring bolt bushings and List No. 18 showing Bunting Piston Pin bushings for all popular cars, trucks, tractors and motors.



The Bunting Brass & Bronze Company

Toledo, Ohio

New York
245 W. 54th St.,
Circle 0844
Chicago
722 S. Michigan,
Wabash 9153
Cleveland
710 St. Clair Ave., N.E.
Main 5991
San Francisco
198 Second St.,
Douglas 6245
Boston
36 Oliver St.,
Main 8488

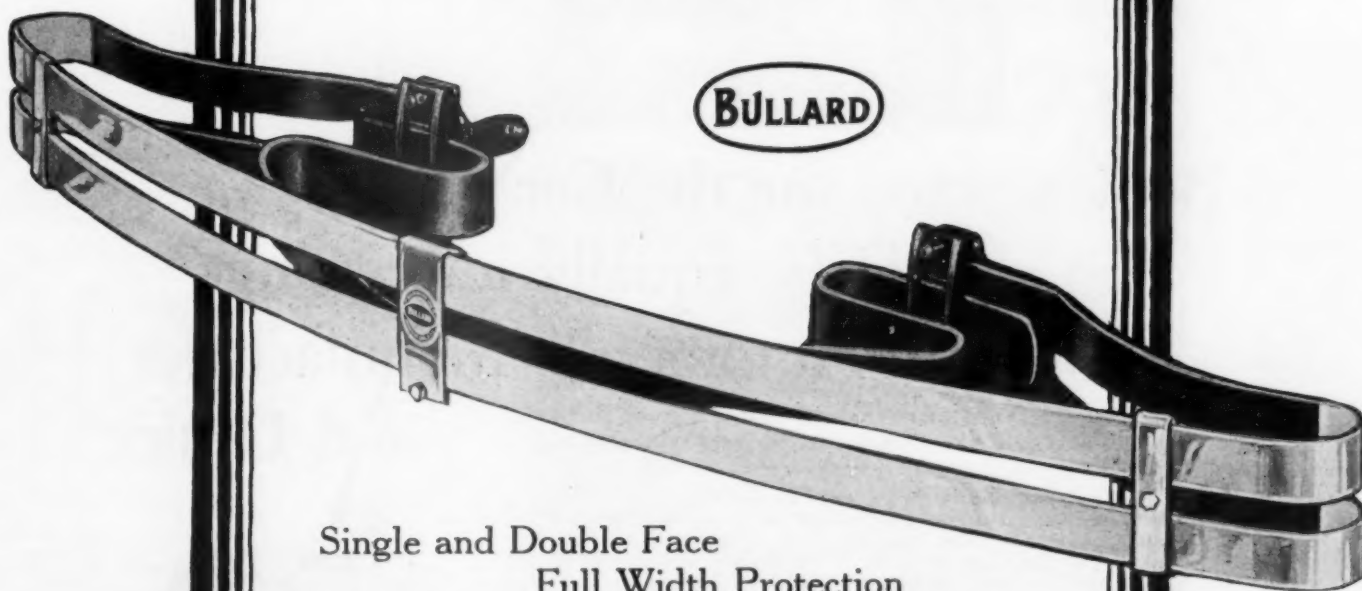


BUNTING BUSHING BEARINGS

BULLARD BUMPERS

CONSTRUCTED of SPRING STEEL—
the full, perfectly arched curves of this
newest product of a long-established, nation-
ally known engineering and manufacturing
organization not only **fend off** blows, but
absorb their concussion.

As the force of collision increases, a propor-
tionately increasing resistance is insured,
with no possibility of fracture or crimping.



Single and Double Face
Full Width Protection
Unit Construction

Distinctive Appearance
Balanced Spring Resistance
Easily and Quickly Attached
No Drilling or Machine Work

NO WEAK SPOTS

Write for Prices and Full Particulars

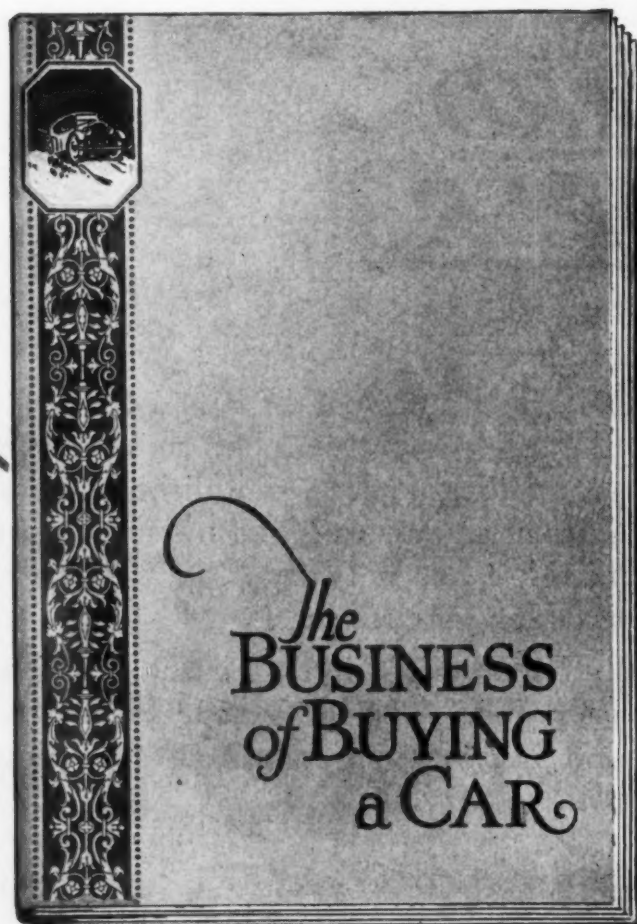
Manufactured under Patents by

THE BULLARD MACHINE TOOL CO., Inc.

(Automotive Division)

Bridgeport, Connecticut, U. S. A.

(Makers of the Bullard Dry Gas Process of Carburetion, the Bullard Multiple Dry-Disc Clutch and the Bullard Shock Absorber).



A Book written for the Car Owner
that should be equally interesting
to every Automobile Manufacturer
and Dealer

A RECENT editorial in Automotive Industries offers this significant suggestion:—

"It is possible that we might learn a great deal more if we paid as much attention to the buyer and his problems as we do to the competitor and his methods. . . . Perhaps we could preserve our individuality better if we studied the customer mainly, his likes and dislikes, his problems, aspirations and requirements."

"The Business of Buying a Car," is a book written entirely from the car owner's standpoint. Among its important chapter headings are:—"When is a Man Justified in Becoming a Car Owner?"; "Buy a Car Comfortably Within Your Income—Then You Will Know the Full Pleasure of Car Ownership"; "Within the Limits Justified by Income, What Type of Car Offers the Greatest Value?"; "Balanced Value is Essential—How to Judge It."

Any responsible person may secure a copy of this book by writing to the

LYCOMING MOTORS CORPORATION, WILLIAMSPORT, PA.

Are you reading the Lycoming pages in The Saturday Evening Post?
The next one appears March 10th.



The Purpose of the RED HEAD

The red head on all new Lycoming "Fours" is used irrespective of size or specifications. Therefore, when seen in either passenger cars or trucks, it may be on any of four different models, solely for the purpose of indicating them as motors made by Lycoming.

The New **LYCOMING** *Motors*



Only 4 Parts

Initial Order at Manufacturing — Cost —

The "Bingo" Timer is built on the same principle as the motor and generator. The brush functions the same way. It's waterproof and needs no oiling or attention once it is installed.

THE "BINGO" ALL-METAL TRACK

The all-metal track and contact points are of brass, imbedded in the molded Bakelite distributing head and extending 1/16-inch beyond its surface. The "raised-track" construction insures long life.

The air-gaps that separate the "all-metal track" from the contact points are something NEW in timer construction. Their purpose is to allow the brush a clean "make and break"—the same method used on armatures for years.

"BINGO" BRUSH AND CASTING

The brush is of a graphite and copper composition—and therefore self-lubricating. The rotor is die-cast which insures accurate timing.

"BINGO" DISTRIBUTING HEAD

—of molded Bakelite and therefore waterproof—also fool-proof against "grounds" and "short-circuits".

This is a very unusual offer, but we want to get the "Bingo" Timer in the hands of the dealers *quickly* and we realize that "DOUBLED PROFITS" will insure *QUICKEST* response and heartiest dealer co-operation.

We need YOU, Mr. Dealer, to preach the goodness of "BINGO" TIMERS to your customers—their accurate timing and fuel-saving qualities.

We know we cannot hope to put the "BINGO" over in a big way without YOU—so that's why we are making you this extraordinary proposition. We want to compensate you *RICHLY* for your co-operation in making "first sales". After that, *repeat orders* will take care of you liberally, generously.

We help you sell them with our display cards and other dealer helps.

And then the "BINGO" will repeat. Once sold, it stays sold. It is a most accurate timer—fool-proof, waterproof, trouble-proof. Unqualifiedly guaranteed to give satisfaction or money back. List Price, \$2.50 (\$2.75 west of Rockies).

Fill out the Coupon TODAY, and mail it.

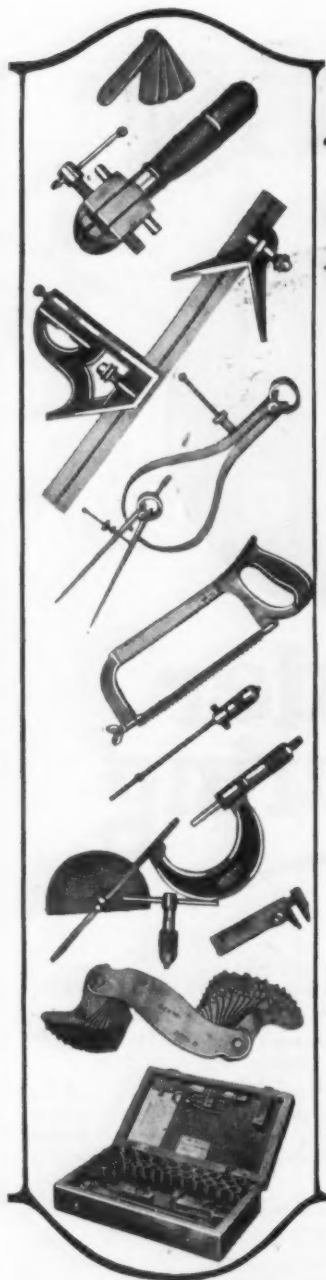
"Cash in" on these RICH PROFITS

The Wm. Deddens Manufacturing Co.
35 East Front Street
Cincinnati, Ohio

TIMER BINGO

FIRES EVERY TIME

--- THE WM. F. DEDDENS MFG. CO. ---
35 E. Front St., Cincinnati, O.
Gentlemen: Send me details of your
"doubled profits" propositions on Bingo
Timers.
Name _____ Address _____ City _____ State _____



mechanics!

Starrett Tools FREE

Enter the Starrett Prize Contest *today*. If you use Starrett Tools you know *why* you prefer them. Put down your reasons in plain language and send them in.

474 separate prizes of Starrett Tools (sets and individual tools of your own selection) will be given for the best letters. (See "A" below for points to cover.) All Starrett tool users have an equal chance. Literary skill doesn't count in this contest. *Facts will win the prizes.*

You can get all the details at any store selling Starrett Tools. Ask for the free Prize Contest Booklet containing complete instructions, description of prizes, etc. (Write for copy if dealer can't supply you.) Enter *today*. Contest closes April 15, 1923.

Write also for Catalog No. 22 "RB"—a great help to contestants.

THE L. S. STARRETT CO.

The World's Greatest Toolmakers
Manufacturers of Hacksaws Unexcelled
ATHOL, MASS.



Your letter may win the Grand Prize—\$150 worth of Starrett Tools (list prices) of your own choosing. And there are 473 other prizes.

A

Write your letter on this subject
"How Starrett Tools Have Helped Me Most
In My Work."

Cover these points:

1. Superior features of Starrett Tools.
2. Advantages of any particular Starrett Tool.
3. Number of practical uses I have found for the tool chosen above.

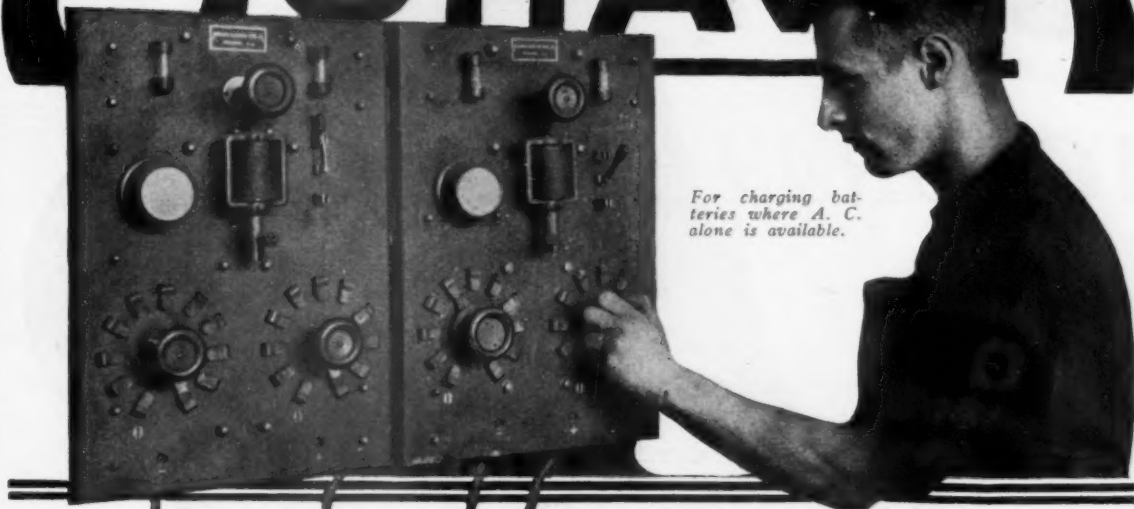
Note: Contestants to be eligible must have used Starrett Tools prior to Feb. 10th, 1923.

Mail to Contest Editor, The L. S. Starrett Co., Athol, Mass., not later than April 15, 1923.



Starrett Prize Contest

MOHAWK



For charging batteries where A. C. alone is available.

BURTON

Can You Afford

—to conduct your buying on a cash-in-advance basis?
—to buy in chain-store quantities in order to secure the lowest possible discounts?

—to do without the facilities of nearby warehouses?
Give a little credit where it is due. Don't begrudge the profit your jobber makes. He earns every cent of it! Treat him like the good friend to you that he is.

ROGERS

Easy Control

In Mohawk's simple control of current is revealed another feature that is fast making it a favorite with service station proprietors everywhere.

Over one hundred graded steps are possible with the two rotary switches included on the slate panel. The left hand switch gives ten steps of ten volts each—and the right hand switch gives ten steps of one volt each.

This affords the closest current regulation and permits the operator to set his charging rate quickly for any combination.

One to fifteen three-cell batteries can be charged on the Mohawk Rectifier. And there is no fear of a sudden surge of current damaging the bulb or the batteries—a positive automatic circuit breaker prevents this.

It's worthwhile writing for the details. Sent on request.

THE BURTON-ROGERS COMPANY

755 Boylston Street, Boston, Mass.

Branch Offices and Distributors in all principal Cities.

MOHAWK RECTIFIER

For Sale through Burton-Rogers Company



**"The Best-Equipped Shop
Gets the Business"**



Arrow Head

ACCURATE



Arrow Head Piston Pins are perfectly round and perfectly straight. Made from solid bar stock S. A. E. specification. Soft cone. Surface case hardened uniformly at all points. Each pin is tested on amplifying gauges and thrown out if there is the slightest variance in accuracy.

The "Arrow Head" is Your Guarantee

Products

SKILL

Arrow Head engineers and mechanics build well because they are experienced and practical. Arrow Head products are built in the largest factory in the world devoted exclusively to the manufacture of Pistons, Piston Pins and Axle and Drive Shafts. Specially designed machinery. Rigid inspection.

ARROW HEAD STEEL PRODUCTS CO.
MINNEAPOLIS, MINNESOTA

General Sales Offices,
616 S. Michigan Ave.,
Chicago, Ill.

Let "Arrow Head" be Your Business Builder



The new Peerless Eight has proved conclusively a statement we made some months ago—that a really fine motor car attracts an eager and appreciative market in America.

Furthermore, in the hands of owners, it has been such a revelation in all that makes a motor car really worth while that the door is open to a far larger market than even we had anticipated.

Wherever dealers alive to the possibilities of a Peerless franchise, take full advantage of their opportunities, the results in profitable business are extremely gratifying.

We suggest that you acquaint yourself with the attractive nature of the Peerless contract.

Write to the factory Sales Department, and we will furnish you with complete information.

THE PEERLESS MOTOR CAR COMPANY
CLEVELAND, OHIO

P E E R L E S S



SURPLUS POWER

ON

THE HILLS

Discriminates the Motor Equipped with

FOSTER

Sensible Lightweight Gray Iron Pistons

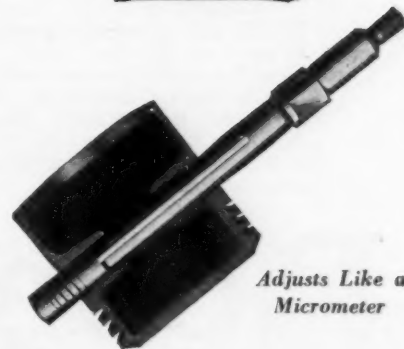
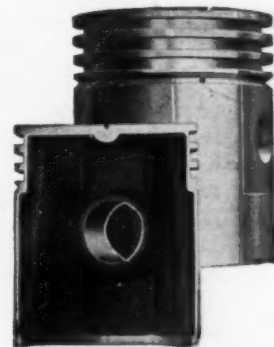
The performance under heavy duty is the test that proves the superiority of **FOSTER** Pistons.

It is consistent with theory and proven by past performance that **FOSTER** sensible light-weight Pistons yield 7% to 10% more power and with lower fuel cost than the ordinary factory standard because they are 30% to 40% lighter.

MR. DEALER, if you are looking for a bigger business and the best will of the motorists in your own territory, supply them with **FOSTER** sensible light-weight Pistons that they may realize highest efficiency from their motors on heavy pulls.

We have the variety in stock for you to select from, therefore, we can make you prompt delivery on pistons for almost any car, truck and tractor.

Our sample cut piston and catalog will be of value to you. We will promptly send them upon your request.



*Adjusts Like a
Micrometer*

Can you select
A better way
A faster way
A surer way
An easier way
Than the F-J way?
If not
Get the F-J way
It's a cash-making way.

Foster-Johnson Reamer Co.

1058 Beardsley Ave., Elkhart, Ind.



There's money for you in tire-flaps!

DO you realize that you can double your tire flap business, in almost no time without additional cost and with but little additional effort? Dealers everywhere are doing it by specializing on Double-D Tire Flaps, the flaps of proven quality.

Heretofore little attention has been paid to tire flap sales. Dealers and car owners alike felt that they were worth using but no one knew exactly how much good they did. It remained for the Dexter Manufacturing Company to prove by actual road tests that Double-D flaps increased tire mileage an average of over one-third.

New sales possibilities

THE way is open to greater volume and greater profit in tire flap sales. The occasional use of a new flap in the tire repair room has given place to a steady demand on the part of the man who comes to you for tire service. In other words tire flap sales have been moved *up front* where they can be made over the counter to almost every tire or tube customer you have.

This is being accomplished by big national advertising to the motorist.

Quality counts

THE only way to be sure that you are getting the most out of this tire flap business is to specialize on Double-D Tire Flaps. Their quality is proven and thousands of motorists are confirming Dexter's famous tests in everyday use.

It's simply economy to use a flap to add one-third to the life of a tube. That's the whole Double-D proposition from the car owner standpoint and Double-D dealers have the facts to back it up.

We help you sell them

DEXTER MANUFACTURING COMPANY is the largest exclusive tire flap maker in the world. Its resources in raw materials and special patented equipment are your guarantee of leadership in the local tire flap market. Its national advertising, convincing booklets and attractive store displays are an expression of our confidence in Double-D flaps as a profitable item for every dealer to handle.

Mail the coupon today. The sooner you become a Double-D dealer, the quicker your tire flap business and profits will grow. Dexter Manufacturing Company, Goshen, New York.

DOUBLE-D

TIRE  FLAPS

Increase tire mileage

Send this today to

DEXTER RUBBER MANUFACTURING COMPANY
Goshen, New York

Please send me your price list and sample of Dexter Tire Flap.

Name

Address



ARE YOU TRADING DOLLARS or MAKING A GOOD PROFIT?

WHICH?

Mass Production Cars

Small discount
Restricted territory
Keen competition
Conventional appearance
Arbitrary factory policies
Impersonal factory relations

Constant pressure from factory
Huge volume of business necessary
for profit

All cars look alike
Little individuality in car
Standard bodies
Big inventory precludes rapid
mechanical improvements
Standard color
Take them as they come off the line

National advertising

Conventional mechanical construction

Courier

Good discount
Adequate territory
Class by itself
Striking appearance
You help make policies
You are part of family and deal with
heads of factory
Constructive help from factory
Large profit on smaller volume

Every car distinctive
Purchaser can express his individuality
Custom built in Courier Shops
Moderate production can make improve-
ments as they come up
Choice of five colors
Choice of wheels, tops, upholstery, steps
or running boards and other features
Intensive local campaign

Talking and service points that
appeal to every driver

COURIER FEATURES

Forty-six horsepower 6-cylinder valve-in-head engine. Full pressure dry crankcase engine lubrication. Transmission ball bearings throughout. Powerful, easy-acting brakes. Low-hung chassis with ample clearance. Automatic chassis lubrication—pressure on plunger forces oil to chassis bearings. 32x4 non-skid Cord tires. Large headlights with anti-glare lenses. Bright nickel-plated

radiator shell. Custom-built bodies, made complete in Courier plant, roomy, yet smart-appearing. Rattle-proof doors. Choice of five bright colors. Several fabric options. Approximately 20 miles to the gallon of gasoline; over 500 miles to quart of oil, and 12,000 to 15,000 miles on a set of tires.

Every automobile merchant has to figure out for himself the side he is standing on but we can show you in dollars and cents just how it will pay you to investigate the Courier car and proposition.

A Full Line of Open and Closed Types \$1195—\$2165 at Sandusky



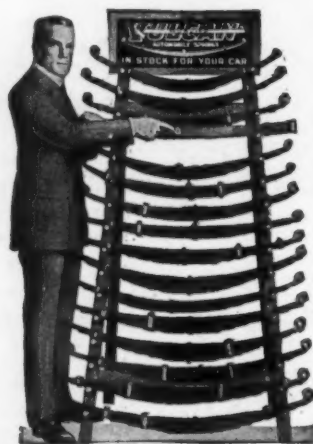
THE COURIER MOTORS COMPANY
SANDUSKY, OHIO.



COURIER

THE MOST COMPLETELY AND CONVENIENTLY LUBRICATED CAR IN AMERICA

Ask Your Jobber for



Rack FREE with Your
Initial Order for 25 Springs

VULCAN
QUALITY

SPRINGS

JENKINS VULCAN SPRING CO., RICHMOND, IND.
Boston Dallas St. Louis San Francisco Portland Seattle



KOKOMO DEALERS are getting the "Heavy-duty" Business

Kokomo Dealers are invariably successful dealers; not only because the famous KOKOMO TIRE is a leader, or because it was the first pneumatic automobile tire ever made, but because the KOKOMO line is complete. The Kokomo dealer can take care of all his trade. He misses no sales because of lack of sizes. In his stock of sturdy KOKOMOS he will find all that he will ever need, no mat-

ter how great his volume. Right now progressive dealers everywhere are stocking KOKOMO heavy-duty cords, to take care of early spring business. Prospects are for an exceptionally heavy demand and the big, efficient Kokomo plant can take care of your orders promptly.

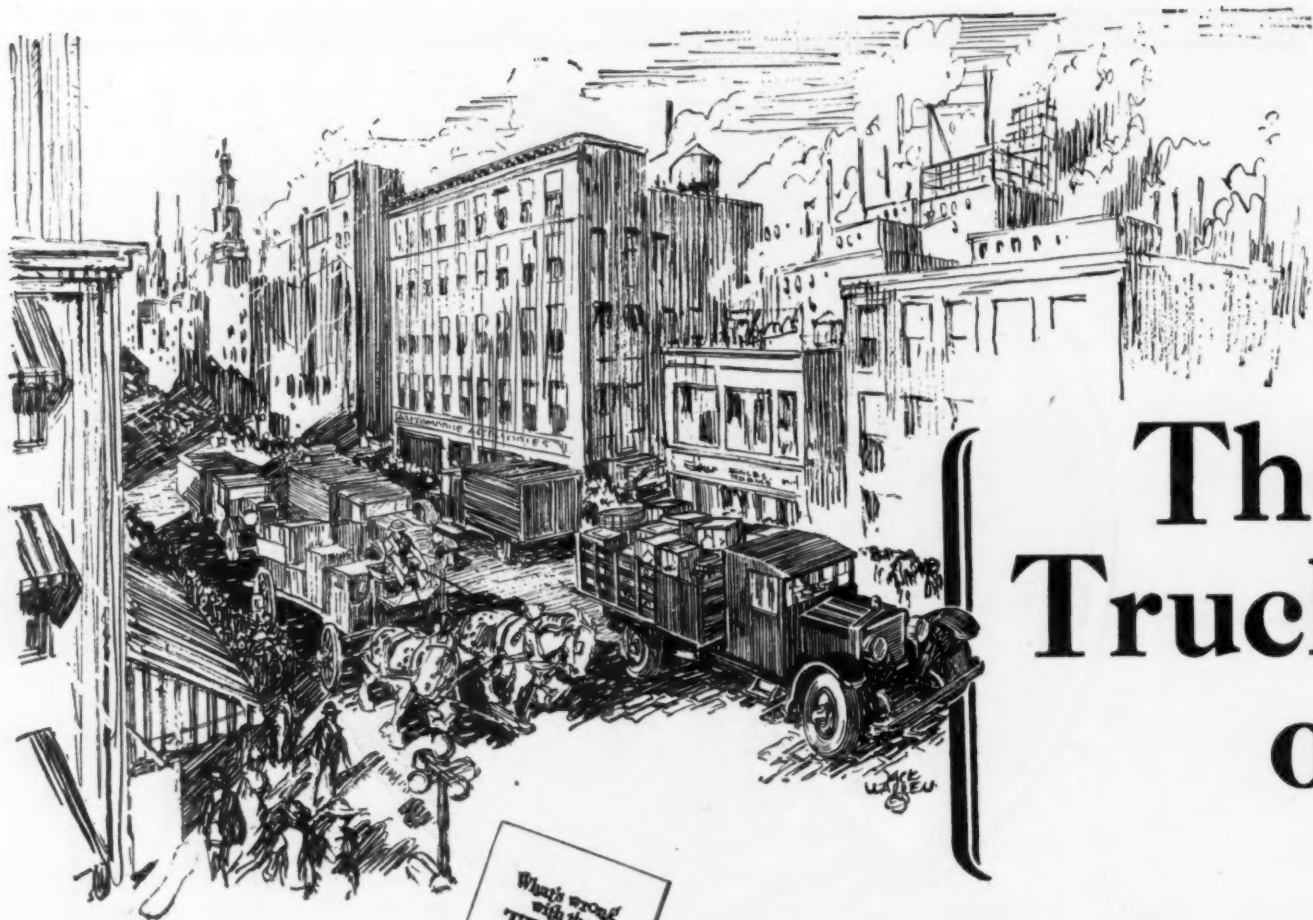
Hook up with the fast-selling
satisfying Kokomo Line

*Means
Something*

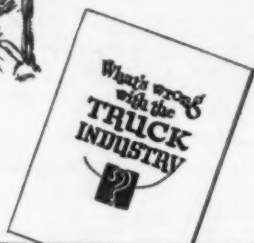
KOKOMO RUBBER CO.,

KOKOMO, INDIANA

LONG ~ LIFE
Kokomo
TIRES AND TUBES



The Truck of



David Beecroft, world known Automotive Authority, has made an intensive study of the motor transport industry.

His findings and deductions will be of interest to truck builders and truck users as well as to all concerned with the advertising of trucks and truck equipment.

"What's Wrong With The Truck Industry?"

by David Beecroft.

Write for your copy.

MOTOR TRANSPORT, formerly the Commercial Vehicle, is devoted to the development of the art and science of the transport of commodities by Motor truck, the transport of passengers by Motor bus and the transportation of both by gasoline railroad car.

Addressed to fleet owners of commercial motor vehicles and to those concerned with fleet operation—its mission is to analyze all problems which properly come within the scope—and to assist in the solution of those problems by means of editorial discussion.

THE CLASS JOURNAL CO.

New York, U. P. C. Bldg.; Chicago, Mallers Bldg.; Boston, 185 Devonshire St.; Philadelphia, Widener Bldg.; Cleveland, Guardian Bldg.; Detroit, 317 Fort St., West; Indianapolis, 1212 Merchants' Bank Bldg.

Publishers of AUTOMOTIVE INDUSTRIES, MOTOR WORLD, MOTOR AGE, MOTOR TRANSPORT, EL AUTOMOVIL AMERICANO, MOTOR BOAT, DISTRIBUTION & WAREHOUSING, THE TIRE RATE BOOK, THE AUTOMOBILE TRADE DIRECTORY.

TOO many have thought of the truck solely as a substitute for the horse-drawn vehicle and the term "horsepower" has even found its way into technical lingo—an expression of the truck's capacity measured in "horse."

But this conception of the truck is too limited, too circumscribed. We have failed to realize that the truck is not an end in itself but rather a means to an end—a tool of industry, whose use brings us face to face with a score of problems of which the truck itself as a mere mechanical assembly, is only one.

Truck problem isn't a problem—It's a problem of transportation!

A new era has dawned in the Truck Industry—an era in which the truck itself, as a mechanical unit, will be regarded not as the major consideration, but as one of SEVERAL factors of major importance.

It is not the truck but the organization behind the truck that counts in the new era and only those truck operators who sense this new need and shape their efforts accordingly will attain success.

The problems of the new era are problems of transportation. Problems that are parallel to the problems of railroad transportation but which in their application to truck transportation are essentially new.

It is the province of a paper—that is truly dedicated to the service of its readers—to lead in the recognition of new developments and especially when those developments promise the reduction of existing inefficiencies.

And so the change of name from Commercial Vehicle to Motor Transport and the widening of editorial scope in the reborn publication is in keeping with the dictates of constructive journalism.

We announce Motor Transport—a fleet owner paper—published twice a month—first issue March 1st. Subscription price \$2 per year. West of Mississippi River \$2.50, Canada \$3. Foreign \$4 per year.



Motor Transport

FORMERLY COMMERCIAL VEHICLE

INTERNATIONAL DEALER SUCCESS *Based on 5 Big Points*

1

—A Complete Line of Quality Trucks—International Motor Trucks are built in fourteen sizes, ranging from the 2,000-lb. Speed Truck to the 10,000-lb. heavy-duty model. There are Speed Sedans, Ambulances, Busses, Funeral Cars, Fire Trucks, Street Flushers, Power Sweepers, Oil Trucks, Dump Trucks, Lumber Units, Log Rollers, Tractor Trucks, and Hauling Units for every commercial purpose—a line offering the International dealer an unequaled sales opportunity.

2

—A Liberal Financing Plan—Our financing plan enables International Motor Truck dealers to do a large volume business on a comparatively small investment. It appeals at once to both the dealer and the prospective buyer.

3

—Forceful Sales Promotion Campaign—Our nation-wide advertising in leading general publications and farm papers is creating new business for the International Motor Truck dealer. A direct mail campaign is sent to a selected list of prospects in each territory. Bill posting [including the dealer's name] completes an advertising campaign that gets results for the dealer.

4

—Personal Sales Help—At each of the 93 branch houses of the Harvester Company there is a complete organization consisting of trained motor truck men. These men are always available to help the International dealer close sales. Our organization not only helps locate and develop new business but it directs that business to the dealer.

5

Life Insurance for Transportation

Each International Motor Truck carries an Inspection Service Policy which provides free inspection at regular intervals for the life of the truck. This Inspection Service is absolutely free to both dealer and user. Factory-trained road engineers make written reports to the owner and the dealer showing the exact condition of the truck. It is after-sale service like this which saves International owners many thousands of dollars every year and brings repeat business to the established International Motor Truck dealer.



International built-in stamina, power, and dependability plus the five business-builders in our contract mean success for the International dealer.

INTERNATIONAL HARVESTER COMPANY

Chicago

of America
[Incorporated]

USA

Motor Truck Department



The STROM Ball Bearing Principle

The highest stage in the development of friction-reducing bearings has been reached in the Ball Bearing.

In this type the rolling element—a sphere—has the advantage of

A single dimension
Continuous working surface
Uniform working surface
Uniform shape
Uniform strength

These advantages promote

Minimum rolling friction
Elimination of problem of aligning and adjusting rolling elements
Accuracy of manufacture
Perfection in finish
Simplicity of construction

All of which result in

Smoothness and quietness of operation
Reliability
Durability
Economy
Efficiency

Any ball bearing having the STROM imprint can be depended upon as incorporating all of the qualities which are essential in a high-grade bearing.



(1966)

A Frank Statement to Jobbers and Dealers

MOST of the jobbers and dealers in the automotive field now handle Bethlehem Betterments for Motordom. I said "most." That's a good average; a very good average. But, it isn't good enough!

Why isn't **every** jobber and dealer in the United States a Bethlehem booster? I want to know.

If the Bethlehem line isn't the best-looking, most practical merchandise at the lowest prices for which quality goods can be sold, I want to know.

So, this is a frank invitation to boosters and knockers alike. I'll appreciate it if you'll lay all the cards right on the table. If there is anything about this merchandise, our prices or our policy, that doesn't appeal

to you one-hundred per cent, I want to know.

Else, we here at the factory are butting our heads against a stone wall. We don't want to work in the dark. We believe we have the best proposition in the field for dealers and jobbers.

And, as I said, **most** of you feel the same way about it. For most of you are enjoying good, healthy profits on a good, healthy turnover.

That's all right, as far as it goes. But I want to hear from the minority. If you have anything on your chest, this is your opportunity to get it off. I want the facts.

Come on, now, you men on the firing-line. Let's have a good, honest letter, straight from the shoulder. So long as you're sincere, I'll take the brick-bats along with the bouquets. Let's have the facts!

C. H. Schwab
President

**BETHLEHEM SPARK PLUG CO. INC.
BETHLEHEM, PENNA.**

*Here's the
merchandise*



Bethlehem Betterments for Motordom

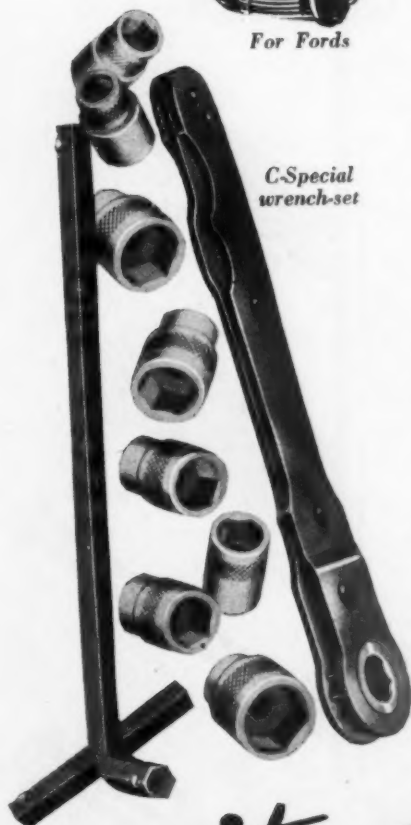


For Fords

Snappy Cap
Bethlehem



De Luxe Model



C-Special
wrench-set

The Snappy Cap for Fords. Press the trigger, cap flies open. Give the radiator its drink, and click-it-closed. Just like that! The demand was so great that we have brought out a Snappy Cap for every car that rolls on rubber.

The new line of Snappy caps (de luxe model) for the higher-priced cars. No wonder they sell. They not only have that million-dollar look, but they make filling the radiator a matter of seconds. The de luxe cap is thief-proof, too.

The new C-Special Bethlehem Quick-way wrench-set—"a whole tool-kit in itself." Made for the motorist who does his own tinkering, and useful 365 days in the year. Has a ratchet handle, an L-handle, short bar for close clearances, and eight sockets that take care of most of the nuts on any car. You know the "A," "B" and "C" sets. This is C-Special. Exactly what car-owners want.

The Mechanics' "D" set—the very last syllable in tool-kits. Takes smallest generator-nut up to largest nut on any car. Has a ratchet handle, an L-handle, a T-handle, three short lengths for cramped quarters, also a universal knuckle—and 23 sockets! A kit for mechanic and motorist alike. And Priced Right!



Mechanics'
"D" Set

Here's Bethlehem Spark Plug No. 8 (Ford part No. 5200). Not "hit or miss"—but HIT!—Five millions of them wringing every ounce of energy out of the motor fuel. Bethlehem Spark Plugs are standard equipment on Packard, Studebaker Light Six, etc. A ready, steady seller all year round.



Write me
personally
Schwab



EMPIRE BOLTS

Can you sell this
plug for - 60¢?

RED TOP
FOR
FORD

HERE'S a real Ford plug of quality and merit —lists at 60c—costs you 36c by the box of ten or 33c by the 100.

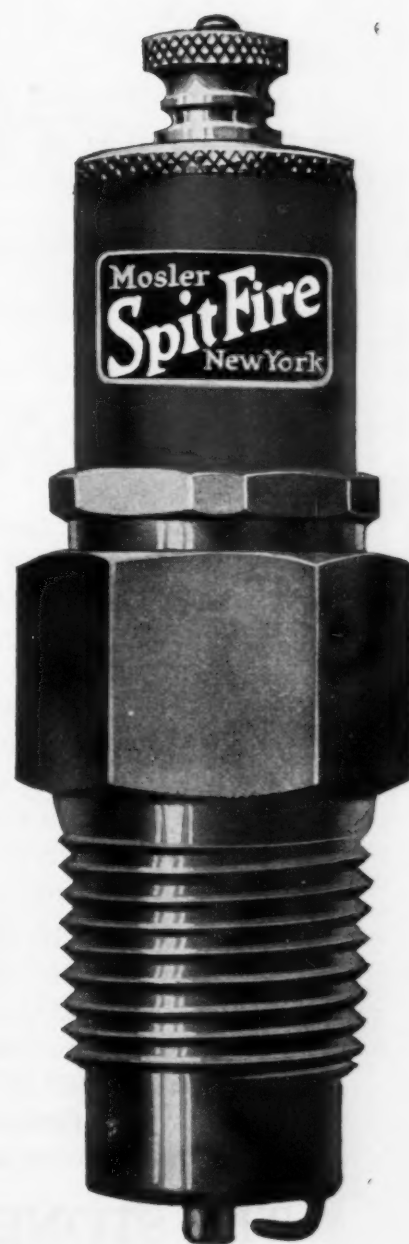
And with your order for 100 we give you FREE a real Display Board that sells plugs for you.

Further—with Spit Fires you suffer no competition from the cut price "Gyps"—Spit Fires are only sold through reputable jobbers. No Spit Fire plugs will get into a "Gyp's" hands—we have taken care of that.

If you are tired of fighting price cutters on cut price lines—a word to us and we will tell you how to beat the game.

At your service—now—every day. Write at once.

MOSLER METAL PRODUCTS CORP.,
MT. VERNON, N. Y.

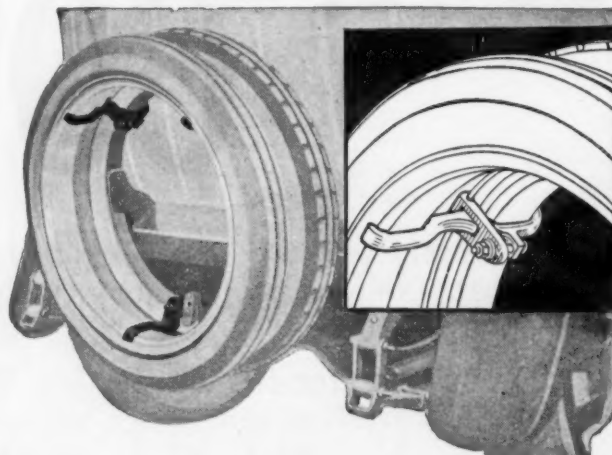


Spit Fire

SPARK PLUG

"Spit Fire"—a name as old as the industry

- helps sell
ITSELF
- helps sell an
EXTRA RIM
- helps sell an
EXTRA TIRE



STONE

Extra Spare TIRE CARRIER

At last! A *real* Extra Spare Tire Carrier. Fits tight and right on *any* car, without the use of ropes or straps. An easy seller —and each one sold paves the way to a rim and tire sale. Neat, compact, simple, strong, the triplicate parts are of malleable iron, silver-finished. They lock securely to the "regular" spare, giving safe carriage to the extra rim and tire. No chafing; no interference with tire covers, tail light or license plate.

Backed by Saturday Evening Post advertising, the Stone Carrier will soon be known and wanted by every car-owner. Order your supply now and be ready. Retail at \$3.50. Ford size, \$3. Good profits for you. Order from your jobber. Handsome window sign with all orders.



Miniature reproduction of one of our large advertisements in
THE
SATURDAY EVENING
POST

Sizes for 3½, 4 and 4½ inch straight side rims and 3½-inch clincher. In ordering specify size of rims and whether for straight side or clincher.

THE STONE MANUFACTURING COMPANY
1502 S. Michigan Avenue, Chicago
We also manufacture Stone Rim Parts, Stone Interchangeable Rims, Stone Shock Absorbers and maintain complete service on all makes of rims and wheels
135 Wooster Street, New York



"THERE'S where we can get Stone Rim Parts"

Steel Cabinet FREE with order for **STONE** Rim Parts

We make Rim Parts for every car. Lugs, Bolts, Nuts, that fit right and tight. Made of tough, malleable iron, they are first-quality, guaranteed products.

The Stone Steel Display Cabinet provides the convenient way of storing, displaying and selling rim parts. Our big Saturday Evening Post advertisements will bring this cabinet to the attention of practically every motorist in your community. Get it on *your* counter. It will connect your store with the advertising and earn big profits for you. *Free* with Stone Rim parts. Display Board also free with smaller assortment. Handsome window signs with all orders. Write your jobber for assortments and prices.

THE STONE MANUFACTURING COMPANY

1502 S. Michigan Avenue, Chicago

135 Wooster Street, New York

We also manufacture the Stone Extra Spare Tire Carrier, Stone Interchangeable Rims, Stone Shock Absorbers and maintain complete service on all makes of rims and wheels

Do you know you can sell other dealers with a McQuay-Norris Service Stock?



A Service Stock of McQuay-Norris Piston Rings, Pistons and Pins enables you to sell other dealers as well as car owners. This means a big increase in your sales and profits.

With a McQuay-Norris Service Stock you can become local headquarters for the replacement of piston rings, pistons and pins—handling the best known and most widely advertised line on the market.

Years of success are behind these products. No other line of automotive parts can attract as much trade to your shop. Ask your jobber's salesman about a McQuay-Norris Service Stock the next time he calls—or, better still, write our Dept. M today and get all the details.

McQuay-Norris Manufacturing Co.

General Offices, St. Louis, U. S. A.

Connersville, Ind.

Toronto, Canada

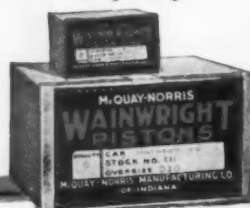
McQUAY-NORRIS PISTON RINGS PISTONS PINS

FOR AUTOMOBILES - MOTOR TRUCKS - TRACTORS - STATIONARY GAS, OIL AND STEAM ENGINES - MOTOR BOATS
MOTOR CYCLES - AIRPLANES - COMPRESSORS - PUMPS - LOCOMOTIVES - STEAMSHIPS - REFRIGERATING MACHINES.

McQuay-Norris Wainwright Pistons and Pins

—gray iron pistons as light in weight as safety permits—specially designed for replacements—available in standard sizes and over-sizes—also in semi-finished form 75-thousandths over-size. Pins of exceptional accuracy. Made of special heat-treated steel.

Pistons and Pins
of quality



LEAK-ROOF—its exclusive two-piece design means equal cylinder-wall pressure at all points. Its greater flexibility means better performance in worn cylinders. Best for all grooves except top, which should have **Supercyl**. Made of Electric Iron. Each ring packed in a parchment container. Price per ring—

\$1 25

In Canada, \$1.50



Supercyl—stops oil trouble. Keeps lubricating oil out of combustion chamber. Collects excess oil on each down stroke of piston and empties on each up stroke, which ordinary grooved rings cannot do. Made of Electric Iron. Each ring packed in a parchment container. Price per ring—

\$1 00

In Canada, \$1.25



JEFFY-GRIP—the quick-seating ring with the non-butting joint. "Seats in a Jiffy." Can be fitted closer than the ordinary step-cut rings. Ends cannot butt when fitted tightly as quick-seating rings should be. Accurately made of Electric Iron. Each ring packed in glassine envelope. Price per ring—

50c

In Canada, 50c

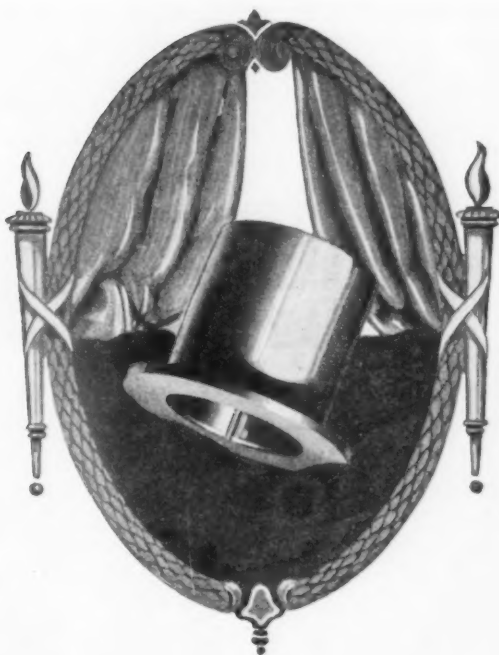


Snap Rings—of the highest grade. Raised above the average by McQuay-Norris manufacturing methods. Made of Electric Iron. Their use insures all the satisfaction possible for you to get from a plain snap ring. Packed twelve to the carton and rolled in waxed paper. Price per ring—

25c

In Canada, 30c





Recognized Leadership Since Pioneer Days in the Industry

Developing year by year from a small brass and bronze foundry and machine shop in 1901, to the plant of today covering 75,000 square feet of floor space, the Johnson Bronze Company has consistently maintained a position of leadership since the first inception of the idea of specializing in finished bronze bushings to the manufacturers' specifications.

More than one million Johnson Bronze Bushings and Bearings are produced every month, bushings for various types of automobiles, trucks, tractors, motorcycles, aeroplanes, heavy and light machinery and all kinds of motor-driven appliances.

With the enormous quantities of tools and patterns, the latter alone being appraised at \$150,000, almost every possible bushing requirement is cared for on short notice and at quantity prices, whether the lot be large or small.

If you want a standard product of virgin metal, produced under the direct supervision of one of the best equipped chemical laboratories and mechanical inspection departments in the country, write today for Stock List of Bushings and Bearings.

JOHNSON BRONZE COMPANY, New Castle, Pa.

JOHNSON

BRONZE BUSHINGS AND BABBITT LINED BEARINGS



GATES HOSE

"The Standardized Radiator Hose"



Marked by Inches
Easily Cut to Length

It's because radiator hose gets all its wear **inside** that Gates Vulco Hose is built with a tougher rubber lining.

Made by the World's Largest
Manufacturers of Fan Belts.



Murray

"Neer A' Worry" TIRES

Built at the Corner of Price Ave. and Quality St.

Car owners are still shopping on Price Avenue, but keeping their eyes on Quality Street as well.

They know that low price means nothing if not coupled with quality. Low prices without quality will not build lasting business.

MURRAY TIRES are built to sell on both of these thoroughfares of trade—Price and Quality. By eliminating all waste in production and distribution we can make a better tire—a super-standard tire—and sell it at a price enabling the dealer to meet any demand or competition.

EXTRA PROFITS

NO EXPENSIVE BRANCHES

TAX AND FREIGHT PAID

NO OLD COMMITMENTS FOR HIGH PRICED MATERIAL

NO BURDENSOME OVERHEAD

SOLD DIRECT FROM THE FACTORY TO YOU

SATISFIED CUSTOMERS

RESTRICTED AGENCIES

Every Murray Tire A Sou'-Easter

Made and tested for the south-east wheel, where the traffic is roughest. The reinforcement on the side wall gives "truck-tire" strength where the strain is hardest.

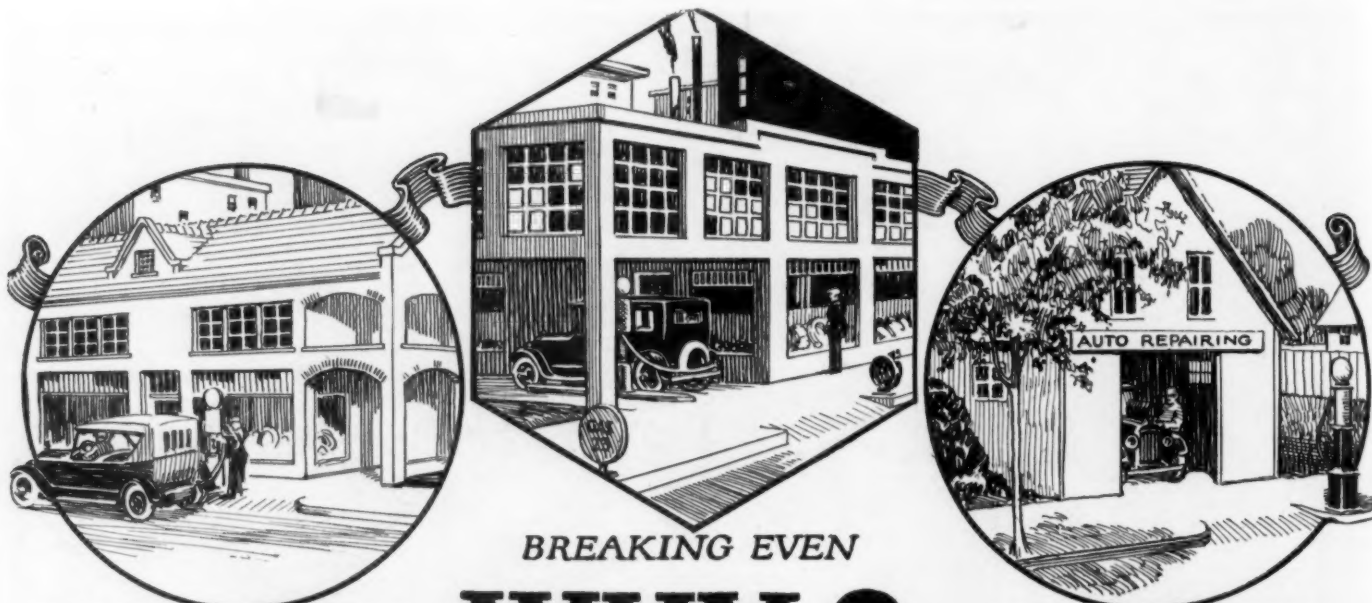
MURRAY

RUBBER COMPANY

TRENTON, N.J.

Write Dept. MA-3 for our Exclusive Dealers' Proposition

Be the sole distributor in your community for this quality, profit-bearing tire. We will be glad to discuss our distribution plan with dealers and show how we can make such a good tire at such a low price.



WHY?

HERE YOU WILL FIND THE REASONS

MOTOR AGE has set for itself a definite mission. It is a business paper of the automotive trade and concerns itself with the greater success of those in this tremendous field.

Among other important features, **MOTOR AGE** brings to its readers the fundamental reasons for success in the automotive trade. It tells why certain types of automotive merchants are successful and why others are not. It gets down to facts and specific reasons. It doesn't preach—it advises. As an influential factor in the progress of the automotive trade, **MOTOR AGE** has as one of its policies the belief that all of us can profit by the experiences of others. In every issue are found many valuable thoughts that were aroused by some dealer's experience.

Thousands of leading automotive dealers the world over are thus profiting by these weekly messages.

MOTOR AGE
5 SO. WABASH AVE., CHICAGO, ILL.



That noise didn't come with the car

When the manufacturer sent out this car, it was a smooth-running, silent machine.

Now, after a few months of service, a strange noise has entered the motor.

The noise may be a grind, a rattle, or a knock. It did not come with the car, even though the original gears were all metal.

Yet the car owner may not realize that any all-metal timing gear will in time become noisy. And the irritation caused by that constant noise can become a reason for his not buying another one of your cars.

Every car manufacturer can prevent this noise by putting silent timing gears in his cars.

CONDENSITE CELORON SILENT TIMING GEARS

are silent and will remain silent. Because they are non-metallic, they eliminate the noise caused by contact of metal. Yet they have the wearing qualities of steel gears. They have the resiliency that absorbs shocks and vibrations, and thus prolong the life of costly metal mating gears. They are water-, grease-, and oil-proof.

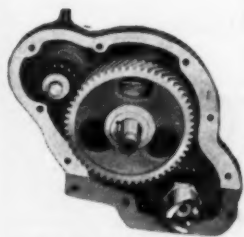
In addition to performing silently and

consistently, they permanently retain the perfect timing of the gear drive.

Celoron Silent Timing Gears can be adapted to any timing gear train. They already have been adopted as standard equipment on many of America's leading makes of automobiles.

Write us for further information concerning Celoron Gears.

CAR OWNERS: Perhaps your present timing gears have lost their silent qualities. If so, have your service station or repairmen replace them with Condensite Celoron Silent Timing Gears.



Installation showing
Celoron crankshaft
and generator shaft
gears

Diamond State Fibre Company

BRIDGEPORT (near Philadelphia) PENNSYLVANIA
BRANCH FACTORIES AND WAREHOUSES
BOSTON CHICAGO SAN FRANCISCO
Offices in Principal Cities

In Canada: Diamond State Fibre Company of Canada, Limited, 245 Carlaw Avenue, Toronto

OF SERVICE	SYMBOL
Day	Blue
Night	Nite
Day Letter	N L

If none of these three symbols appears after the check (number of words) this is a telegram. Otherwise its character is indicated by the symbol appearing after the check.

WESTERN UNION TELEGRAM

NEWCOMB CARLTON, PRESIDENT

GEORGE W. E. ATKINS, FIRST VICE-PRESIDENT

RECEIVED AT

D412 77 NL

PO PORTLAND ORG 11

1696

STUTZ MOTOR CAR CO

INDIANAPOLIS IND

STUTZ SIX WALKS AWAY WITH HONORS AT AUTO SHOW CLOSING SATURDAY ALL
 SHOW MODELS AND PROMISED SHIPMENT FROM FACTORY THIS MONTH SOLD CLEAN
 DEALS NO TRADES PROSPECT LIST WILL KEEP US BUSY REST OF MONTH FRANK
 WATKINS FIRST STUTZ OWNER IN OREGON IN NINETEEN TWELVE BUYS FIRST
 STUTZ SIX CAR CONQUERS MT CALVARY HILL IN HIGH GEAR IN FIRST
 DEMONSTRATION WINDING STEEP CURVES OF THIS HILL HAVE DEFEATED MUCH
 LARGER CARS LOOKS LIKE A GREAT YEAR FOR STUTZ.
 AUTOREST MOTOR SALES CO.

"Sitting Pretty!"

—that describes the position of Stutz distributors and dealers.—Wires like the one reproduced above prove it.—The new Stutz Six is an unprecedented sales-getter.—The higher priced Stutz Speedway Four models are breaking all previous sales records.—Distributors and

dealers whose foresight prompted them to sign up early for the phenomenal Stutz line for 1923 are reaping big profits.—It may still be possible for you to get a share of them.—Open territory is now being assigned.—A letter or wire will bring full particulars immediately.

STUTZ SIX—\$1995

F. o. b. factory

STUTZ MOTOR CAR COMPANY of AMERICA, Inc., Indianapolis, Indiana, U. S. A.

Would you like us to do this for you?

SUPPOSE after investigation and a talk with our representative you decided that you ought to stock Hanes Cords. After you had given our representative the order and were getting ready to shake hands and say "good-bye" — suppose instead of going, that this representative sat down and told you something like this.

"Mr. Smith, you have listened to my story, found out that it had facts to back it up and have decided to take an initial order of Hanes Cords. That's fine! But we want to make sure you come back for more Hanes Cords. Because we do, we are going to run an advertising campaign of 7,800 lines in your local paper and pay for it ourselves to help you sell these Hanes Cords quickly. This campaign is going to

tell your customers the Hanes story and convince them of Hanes quality and service just as you have been convinced. And after that first order of yours has been sold out we are not going to leave the rest up to you. We are going to come back and give you more newspaper advertising and outdoor and direct by mail advertising as well."

After a story like that you'd probably give our representative one of your best cigars or something stronger if you had it on tap. Well, that is just what we will do for you, so if you feel like handing out any compliments, the greatest we could receive would be a letter from you telling us to send that representative around to see you. Is it a go?

THE HANES RUBBER COMPANY

Winston-Salem, North Carolina

HANES CORD TIRES

The High Water Mark in Tire-making Skill



Your Customers
Don't Want a
Pretty Tire Pump
— — What They
Want Is Service



MONROE *Self-Oiling* TIRE PUMP

Just because a tire pump is all "dolled up" outside with shiny brass and other ornamentation, it doesn't mean that it's a better pump. It's the "works" inside that determines its lasting worth.

No tire pump, without a permanent means of lubricating the valve leather, can be expected to stand up long in service. The leather has a tendency to become hard and brittle. When the pump is used the leather cracks. The air, instead of being forced to the tire, leaks back into the barrel.

The MONROE, with its patented self-oiling washer, is the only tire pump that effectually overcomes this great advantage. The valve leather is kept constantly soft and pliant. Full compression always, even though the pump may be out of use for months at a time.

Jobbers and dealers, who have investigated, specify the MONROE in preference to any other pump. Costs less—brings in quick, substantial returns. Write at once for full particulars and prices.

Monroe Auto Equipment Manufacturing Company
Monroe - - - - - Michigan

Sales Representatives to Jobbers Only

The Fulton Company - - - - - Milwaukee, Wis.



Monroe Closed Car Spotlight Bracket

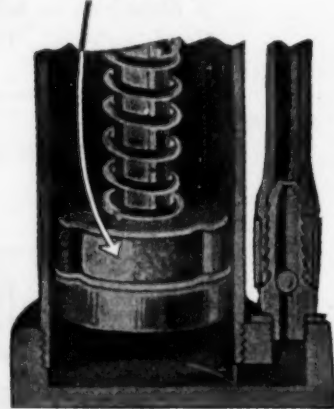
A new Spotlight Bracket for closed cars that thousands of motorists have been waiting for. Will fit practically any spotlight on the market. A big seller that brings a quick, sure profit.

Monroe Brake Shoe for Fords

Insures uniform and even braking for every Ford car. Simple and strong. Easily and quickly installed—no special tools required. You'll find this shoe a snappy business booster among Ford owners.



**PATENTED
SELF OILING
WASHER**



The illustration above quickly and clearly shows why the MONROE always delivers a full barrel of air. A felt washer, located just above the valve leather, is thoroughly soaked with a leather-preserving oil. On each up-stroke of the pump a little of this oil is released and is absorbed by the leather. This keeps the leather soft and pliant so that it readily spreads on the slightest down motion of the plunger, completely filling the cylinder and preventing all possible chance of leakage. MONROE SELF-OILING Tire Pumps are made with 1 1/4 and 1 1/2 inch barrels, black enameled, with nickel-plated cap and ferrule. Well-finished handy grip wood handle. Wire foot base, which folds up out of the way when in the car.

GURNEY BALL BEARINGS

Authorized Distributors

ALABAMA

Birmingham—Birmingham Bearings Co.
Gadsden—Cox & Williams
Mobile—Izard Motor Co.
Montgomery—C. R. Ballard & Co.

CALIFORNIA

San Francisco—Irvine Silverberg & Co.
Los Angeles—Jos. A. Masterson & Co.

DISTRICT OF COLUMBIA

Washington—Bearing Sales Co.

FLORIDA

Jacksonville—Auto Parts Co.
107 Clay St., Telephone 7414
St. Petersburg—Ace Automotive Co., 252 2nd Ave., So.
Tallahassee—Tallahassee Overland Co.

GEORGIA

Atlanta—Southern Bearings Co.,
375 Englewood Ave. Tel. Ivy 7932
Augusta—Bearings & Battery Service Co.,
655 Broad St. Tel. 384.
Albany—Thad Huckabee Auto Co.
Columbus—J. L. Couch Co.
Dawson—Lock-Mathias Motor Co.
LaGrange—Auto Bearings & Supply Co.
Macon—D. H. Adams Motor Co.
Rome—Hight Accessory Place
Thomasville—James Gribben
Valdosta—E. H. Rogers

IOWA

Des Moines—Walton, J. M.
1020 Grand Ave. Tel. Walnut 3354-3088

ILLINOIS

Chicago—Berry Bearings Co.,
2711 Michigan Ave.
Chicago—L. C. Smith Bearings Co.,
2208 Michigan Ave. Tel. Calumet 277

INDIANA

Indianapolis—Auto Equipment Co.,
1021 No. Meridian St. Tel. Main 6373—Main 0383
Evansville—Lannert Mfg. Co., 210 So. 6th St. Tel. 365

KENTUCKY

Louisville—Columbia Motor Truck & Supply Co.,
117 South 7th St.

MARYLAND

Baltimore—Motor Parts Co., 1419 N. Charles St.

MASSACHUSETTS

Boston—Units Parts Co.,
601 Newbury St. Tel. Back Bay 8089
Springfield—Parmenter Co.,
680-682 Main St. Tel. Walnut 4900

MICHIGAN

Detroit—Detroit Ball Bearing Co.
3958 Cass Ave. Tel. Glendale 2509

MINNESOTA

Minneapolis—Reinhard Bros. Co., Inc.,
11 South 9th St.

MISSISSIPPI

Meridian—E. S. Curtice, 2214 8th St. Tel. 16

MISSOURI

Kansas City—H. H. Kerr Bearing Co.,
1933 McGee Trafficway—Tel. Harrison 5077

MONTANA

Great Falls—Montana Bearings Co., 324 2nd Ave., So.

NEW YORK

Buffalo—Buffalo Bearings Co., 1030 Main St.
New York City—R. & L. Bearings Co., 1819 Broadway

NORTH CAROLINA

Raleigh—Motor Bearings & Parts Co., 403 Fayetteville St.,
Tel. 2711
Asheville—Commercial Truck Service Station
Charlotte—Southern Bearings Co., 12 S. Poplar St.
Gastonia—Moore & Stewart
Greenville—Brunson Accessory Co.
Greenville—Mines Motor Co.

Greenville—W. N. Watson
Greensboro—Motor Bearings & Parts Co.,
116 Market St. Tel. 2337
Kinston—H. H. Hodges Co.
Rocky Mount—F. P. Dunn
Salisbury—Odell Motor & Equipment Co.
Wilmington—W. D. MacMillan, Jr.

OHIO

Cleveland—Detroit Ball Bearing Co.,
6537 Euclid Ave. Tel. Randolph 2336
Cincinnati—N. J. Hebbard Co., 205 E. 8th St.
Columbus—Bearings Company of Columbus,
75 So. 4th St. Tel. Main 7319, City 9482
Dayton—Triangle Wheel Co., 213 Main St. N.

OKLAHOMA

Oklahoma City—Sharp Auto Supply Co.,
406 N. Broadway. Tel. 227 Maple
Ardmore—Anderson Auto Salvage
Blackwell—Wiggins Motor Co.
Cushing—O. K. Vulcanizing Co.
Enid—Strickler & Howell Accessory Co.
Guthrie—Garlick Bros.
Muskogee—Anderson Sibbett Co.
Ponca City—S. & N. Motor Supply Co.
Tonkawa—Knables Garage

OREGON

Portland—West Bearing Co.,
452 Burnside St. Tel. Broadway 5006

PENNSYLVANIA

Philadelphia—H. P. Schade Co.,
821 No. Broad St. Tel. Bell Poplar 3770,
Keystone Park 3012
Pittsburgh—Gwilliam Company,
418 Melwood Ave. Tel. Schenley 3143

SOUTH CAROLINA

Charleston—Atlantic Tire Service Co.
Chester—Chester Accessories Co.
Columbia—Whitton Auto Wrecking Co.
Sumter—R. & S. Bearings Co.
Spartanburg—Spartan Hardware Co.

TEXAS

Dallas—Western Gear & Parts Co.,
317 Bourbon St. Tel. Main 644
Fort Worth—Western Gear & Parts Co.,
111 E. Belknap St.
Houston—Bearings Co. of Texas, 619 Preston Ave.
San Antonio—Hill Auto Supply Co., 406 E. Travis St.
Wichita Falls—Hill Auto Supply Co.

TENNESSEE

Nashville—Automobile Bearings Co., Inc.,
620 Commerce St. Tel. Main 1969
Chattanooga—Wallace Buggy Co.
Knoxville—McNutt & Burks Battery Co.,
307 No. Central Ave.

UTAH

Salt Lake City—Geo. J. Silver, 1207 S. 8th East St.

VIRGINIA

Norfolk—Lintz Ball Bearing Co.,
729 Granby St. Tel. 25066
Roanoke—Shockley Motor Co., 109 Church St. Tel. 1466

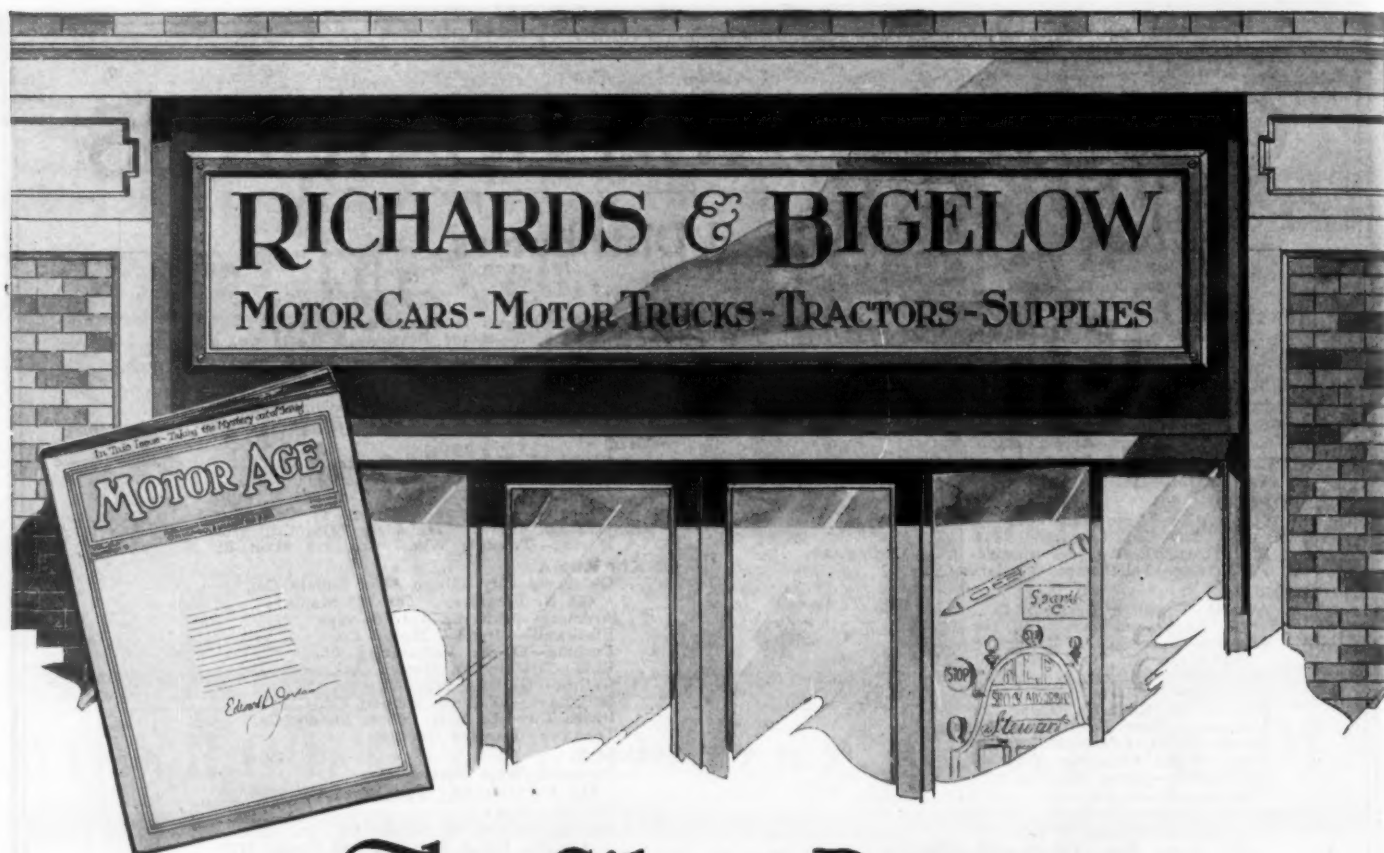
WASHINGTON

Seattle—Northwest Bearings Co.,
601 East Pike St. Tel. 5000
Aberdeen—Cadwell Transportation Co., 419 E. Wishkah St.
Bellingham—Tabor & Cruikshank,
1327 Dock St. Tel. 422
Centralia—McDowell Bros., 721 No. Tower Ave.
Everett—White Motor Car Co.,
2812 Rucker Ave. Tel. Main 205
Spokane—Auto Gear & Axle Co.,
1104 W. 1st Ave. Tel. Main 4861
Tacoma—R. W. Schmack, 714 St. Helena Ave. Tel. Main 1913
Walla Walla—K. S. Automotive Parts Co.,
51 Spokane St.
Yakima—United Parts Service Co.,
109 So. 2nd St. Tel. 38

Gurney Ball Bearing Company

Jamestown,

New York



—The Silent Partner

To thousands of progressive automotive merchants MOTOR AGE is a source of sound advice and helpful suggestions. To these men it holds much the same position as a silent partner. It gives wise and varied counsel. It cites the experiences of other men. It warns of "get-rich-quick" methods, yet advises sweeping away the cobwebs.

In short, MOTOR AGE brings to an army of readers the kind of information that only a leading business paper can gather together. The sincere, unbiased manner of presenting this information has won for this paper a healthy, whole-hearted respect from men who are shaping the destiny of the automotive trade.

Those who read MOTOR AGE are progressive, thinking men. Those who advertise in it are in good company.

MOTOR AGE

5 So. Wabash Ave., Chicago, Ill.

Distributors Are Seeing The Big Possibilities In Our New Proposition

Look for the
Yellow Band

Every armature rewound
by us carries this band
on which is printed our
positive guarantee that
the armature will give
the same service as a
new one.



Dealers and Repairmen

Send in your defective armatures
to be rewound

We maintain a stock of over
6,000 rewound armatures for
exchange purposes. All orders
are shipped the same day the
defective armatures are received
by us. Our liberal guaranty
protects you fully.

Get Ready For the Spring Business Rush

The spring overhaul business
will soon be at its height. Be
prepared for the armature busi-
ness you are bound to get. Send
in the old cores you have and
get guaranteed rewound ones in
their place. Keep a small stock
on hand.

PRICES

Ford Armature Rewound.....\$2.00
Any two unit generator
armature rewound.....\$5.00

Although our distributor plan was announced but a few months ago we now have distributors in every state in the union. These men are making money from armature service. This business is growing steadily—as they see how comparatively easy it is to get this business they give more attention to it. While all of them were convinced of the soundness of the proposition at the very beginning, many of them have expressed real surprise at the way the business keeps building up.

To men or concerns qualified to act as distributors of armature service we have a plan that offers the kind of opportunity you don't come across every day.

Our distributors maintain stocks of rewound armatures so they can supply the dealers in their territories with immediate exchange service. We issue a broad, unconditional guarantee with every armature rewound by us. The capital required by a distributor is surprisingly small. Ordinarily, there is a complete turnover of capital several times a year. The investment is always represented by merchandise which can be liquidated at any time. Our discount terms enable our distributors to sell armature service at the same prices we advertise nationally and still retain a most satisfactory profit for themselves.

*At your request we shall be glad
to submit full details of this plan.*

U.S. AUTOSUPPLY COMPANY

ARMATURE SERVICE DIVISION

3845 South Wabash Avenue

Chicago



IDENTICAL!

Identical pointing is as necessary to correct meshing as identical pitch. Notice that the pointing of Huetter's gear teeth is *exactly* the same as the pointing of the Eclipse Bendix Drive.

Huetter Fly-Wheel Gear Bands are chamfered to specifications recommended by the manufacturers of the Bendix Drive. This chamfer not only retains the maximum strength in the point of the tooth, but assures positive, easy, quiet meshing.

Huetter Gears are more than worth the slightly larger price. They are quality gears all the way through—machined out of hard, tough steel, and electric welded.

And the fact that you can get instant shipment on Huetter Gears means much when you have a car torn down in your shop.

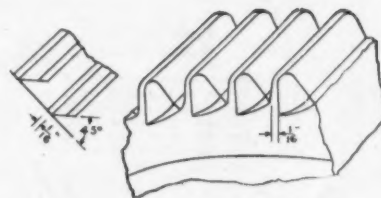
Order Now—Prices Are Sure to Advance Soon!

Huetter's Fly-Wheel Gear Bands

HUETTER MACHINE & TOOL CO.

545 Kentucky Ave.

INDIANAPOLIS



*Write today for our
new Catalog List!*

That

Efficient Rail - Carrier and Hoist can be made the most convenient thing around the shop.

**Price Complete with a
Wright High Speed Hoist
1/2 Ton \$75.00, ready to
install**

Order one today.



WRIGHT
MANUFACTURING
COMPANY
MILWAUKEE, WIS.

HIGH SPEED
HOISTING & CONVEYING OUTFIT

"Your Cooper Testing Valve Saved an Hour's Time in Locating the Trouble"

Your customer appreciates having you recognize his good judgment in the equipment of his car. He also appreciates you giving him sound advice in the selection of equipment. You can recommend the Cooper Special Motor Testing and Carbon Outlet Valve to your trade with the assurance that it will make good. Thousands of seasoned motorists insist on having the Cooper on every car they buy. It sells on its reputation.

The *Cooper* SPECIAL Motor Testing and Carbon Outlet Valve

The large elongated valve opening gives free exit for the exhaust gases which carry with them carbon and soot, keeping the motor clean and sweet, saving fuel and oil and making frequent valve grinding unnecessary. A fouled motor may be cleaned by injecting a little alcohol or commercial carbon remover and after a few hours blowing the loosened carbon out through the Cooper Carbon Outlet Valve. It is a valuable aid as a Motor Testing Valve—helps locate the trouble quickly.

The "Cooper" is simple and durable. Extra heavy axle and spring prevents chattering. Not necessary to cut exhaust pipe in two—simply cut oblong hole, fit the Cooper around it and draw up the bolts. Standard Equipment on Paige Daytona Model.

Prices

1½ in.	\$2.50
1¾, 1¾, 1¾	3.00
2, 2¼	3.50
2¼, 2¾, 2½, 2¾	4.00
2¾, 2¾, 3	5.00

Cooper Special Valve complete with pedal for Fords, \$3.00.

When Cooper Testing and Carbon Outlet Valve is ordered complete with Dash Control, add \$2.50 to above prices. Add 10% to these prices on Pacific Coast. Ask your dealer. Dealers ask jobbers.



Patent applied for

\$2.50

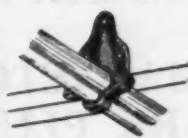
Cooper Dash Control

A handy, positive control for Motor Testing and Carbon Outlet Valves, exhaust heater valves, air chokes, radiator shutters, etc. Right at your finger tips fits the hand perfectly, a twist of the wrist locks it in any position. No interference with levers, pedals or floor board—a feature liked by men who service batteries. To install simply cut half-inch hole in dash. Made of brass and steel with exposed parts handsomely nicked and polished. Price \$2.50.



Patented

Cooper Steering Column Support for Fords



Holds steering column absolutely rigid; takes out all vibration from steering wheel. Adds greatly to comfort of driving especially over rough roads. A strong casting, black finish; fits any Ford having instrument board, both open and closed models. Packed in individual cartons—75c.

Manufactured by

Cooper Mfg. Co.

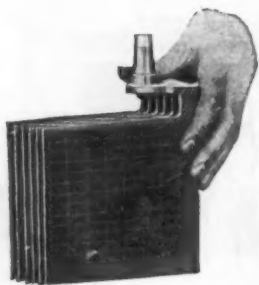
Dept. 15-C. Marshalltown, Iowa

The Fulton Company

Milwaukee, Wis.

Sales Representatives.

WINTER BATTERY PLATES



OUR 90-DAY PLAN

Our 90-day plan enables you to buy plates *as you need them* at quantity prices without loading your shelves with stock. Ask about it.

YOU will not have cold weather complaints if you use **GENERAL winter** plates. Designed for hard work, they deliver plentiful current to the starter during the hardest part of the battery man's year.

The high capacity of **GENERAL winter** plates gives your customers *summer* satisfaction in the coldest weather. Think what this means to your business and your business reputation.

The cost of **GENERAL winter** plates is no higher than that of ordinary plates. Write us about our 90-day plan, by which you can buy at quantity prices without a big money investment.

Our folder "A Shop Talk on Battery Plates" gives some interesting tests that may be new to you. It is yours for the asking.

General Storage Battery Co.

2005 Locust Street,
St. Louis, Mo.



Always Look For
"The Name"
ROBERT BOSCH
and This
TRADE MARK




Type
ZU4
Magneto

IT IS MUCH BETTER
to represent the sale of the genuine, *original*

**BOSCH MAGNETOS
AND SPARK PLUGS**

in your territory now—than to wish you had
this valuable selling franchise—later!

There is some attractive territory available.

Full details on request.

Robert Bosch Magneto Co., Inc.
OTTO HEINS, President
123 West 64th Street, New York
Chicago Branch: 1302 South Wabash Ave.





THE ORIGINAL
SILENT TIMING GEAR
For Passenger and
Commercial Cars

Preferred by the trade because
**SILENCE — ACCURACY —
DURABILITY** are guaranteed—a
better job with a better gear.

They are now standard equipment
on most of the good cars.

Complete stocks for immediate de-
livery at a hundred convenient points,
for practically every popular passen-
ger car and commercial vehicle manu-
factured since 1916.

Send for price lists and name of your
nearest jobber.

Manufactured by
DALTON & BALCH
Incorporated
2333 Michigan Blvd., Chicago
Members of the
American Gear Mfrs. Association

THE UNICO NEWS

Published by the UNICO MOTOR PRODUCTS CORP.

Vol. 1. No. 3.

Thursday, March 1, 1923

Price Three Minutes

ONE KICK IN 50,000 SALES

**UNICO Motor Products Corp. Breaks all Records; Belief
Good Performance Reacts to Increase Sales**



St. Louis, Mar. 1. — A fifty cent piston ring can sell in volume purely on price, but a

successful fifty cent ring must sell in volume without an appreciable percentage of complaints, to say the least. The cause of the first and only UNICO complaint has never been discovered. The ring was sent back with the remark that it was "unsuitable." In accordance with settled policy, the buyer received the list price of his ring without quibbling or questions.

Before or since there has never been a complaint of any kind as to the material, workmanship or performance of any UNICO ring.

TRIED BEFORE MARKETING

The men making UNICO rings had several new ideas about manufacturing practice, materials, and designs. Every one of these ideas was thoroughly tested before the first UNICO ring was offered. The final result is in the headline.

Three factors go to make up this record. The greatest is manufacturing ingenuity. Only a few UNICO rings are turned at one set-up. The result is that practically every UNICO ring is free from low or high spots, has not been warped, and has its natural elasticity.

The second factor is the price of fifty cents. There's

no fumbling through a catalog to find and name a price; no complicated bookkeeping. There's a healthy profit on fast-moving sizes; and very small investment in odd sizes. The third factor is rigid inspection. This keeps every tool in the UNICO shops tuned up. Before a UNICO ring goes to the user, with the jobber's, repairman's and manufacturer's reputation depending upon it, it must pass a series of inspectors that make an insurance physician examining a risk, look like a blind man.

LARGE STOCK GIVES QUICK SERVICE

With perfect performance, a price that makes easy sales, and good profits, there still remains this question: "How quickly can UNICO rings be had, should stock run low?" The answer is the number of jobbers, daily increasing, who handle UNICO rings, and the stock of 1,000,000 at the factory for speedy shipment. Ordering is easy. A system of code words compresses all information into a short message. All sizes are in stock, excepting very rare ones, which are made up at very short notice.

JOBBER APPROVE UNICO POLICIES

Even Break and Clean Competition
Hailed; Few Requests For Favors

(Special Correspondence)
Special discounts are never

granted to jobbers by the UNICO Corporation. Price cutting has no place in the merchandising methods of that company. Special discounts breed trouble. They cause friction in the most unexpected and undesirable places. They retard sales more than they help.

ADVANTAGE ONLY TEMPORARY

The slight immediate ad-

vantage gained by special discounts is more than offset by the difficulty of explaining them away, and by slow movement of the larger stocks taken to get the concession. So the UNICO Corporation gives the same discounts to all. These cover all selling expense, overhead, etc., and leave a very satisfactory net.

UNIC-OIL

Concentric
Individually
Cast



Efficient
and
Economical

List Price 50c

List Price 50c

QUICK-SEATING STEP-CUT



List Price 25c & 30c

Quality Best of All—All of Best Quality

Ask Your Jobber

UNICO MOTOR PRODUCTS CORP.

Kingshighway & St. Louis Ave.

St. Louis, Mo., U.S.A.

ADVERTISEMENT

TRINDL PISTON PINS and SUPER WARP PROOF VALVES



You Can Be Sure of the Results With TRINDL PISTON PINS

You need to be careful in selecting the grade of piston pins you furnish for replacements. They must be of acknowledged best materials; they must be accurate. Also, the price must be right to allow a good profit.

TRINDL Piston Pins do all this. Our equipment guarantees both quality and price—and our prompt service on standards, oversizes and specials—any size and quantity—makes TRINDL Pins the standard replacements in shops all over the country. Have you our list? It is the most complete published. All sizes listed, with prices. Send for one today.



OVERSIZE STEMS FOR WORN VALVE GUIDES

Most repairmen know the problem presented by worn valve guides, which, after being reamed out, are too large to accommodate the stems of either the old or new valves, without replacing the valve guides.

TRINDL Super Warp Proof Valves solve the problem. They can be obtained with oversize stems to take up the space reamed out of the guide. And they can be obtained promptly! We ship them within twenty-four hours of the receipt of your order!

TRINDL Super Warp Proof Valves are making a hit with garage and repairmen. They have a large underhead, which gives more pep to the motor because the old gas goes out of the cylinder quicker. They are made of a special alloy steel that insures longer life. The process is a special one. The valves are just the thing needed for replacements—they make good, and pay better profits.

Standard or oversize, for all motors, shipped promptly! Send for our size and price list—the most complete published.

THE TRINDL CO.

2917 Wabash Avenue,

Chicago, Ill.

Milwaukee Branch: 615 Wells Street

"How to Make Money Out of Air!"

THERE is a real profit—
MONEY—in handling BRUN-
NER Compressors in the right way.

No extra investment required.

Simply a knowledge of what you can
do with a BRUNNER—and how to
do it.

Write for Folder just off the Press

Containing fully illustrated suggestions as to
ways and means for actually making money
with BRUNNER Compressors.

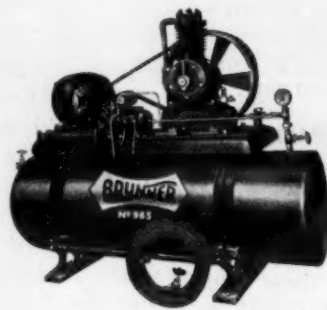
If you've been thinking of your air service as an
"all going out and nothing coming in" proposi-
tion—Write for your copy of this new folder.
"You'll be surprised!"

BRUNNER MFG. CO., Utica, N. Y.

Cincinnati

Kansas City

San Francisco

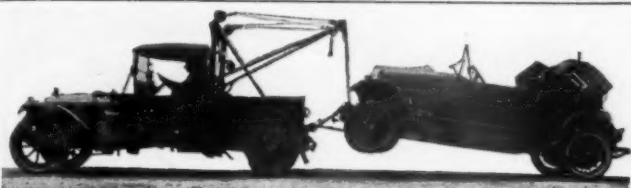


Model 965

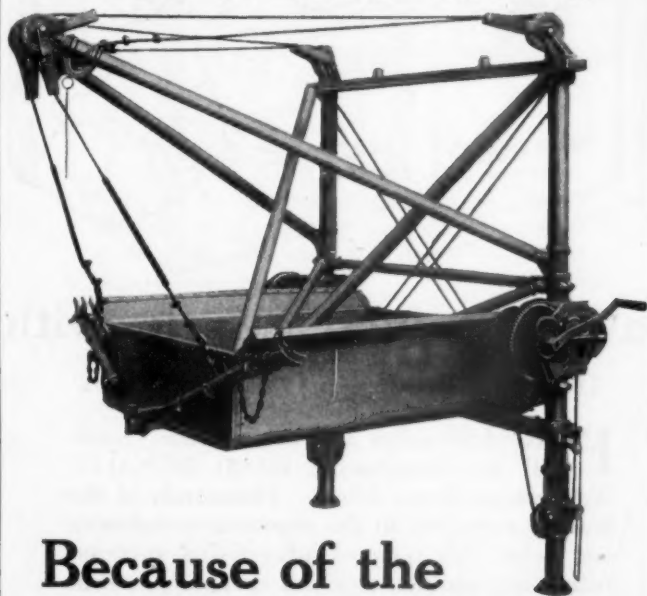
A Genuine Heavy Duty Outfit. The
2-cylinder divided-load Brunners are,
we believe, the most efficient garage
compressors possible of manufac-
ture. Models, sizes and prices to
suit all purses and all requirements.

Good for "TWENTY YEARS AT HARD LABOR"

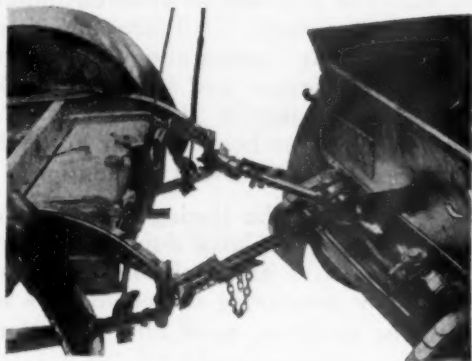




Tow Fast In Safety You Can Do It With A Holmes Auto Wrecker



Because of the "V" Towing Coupler



You can haul a wreck as fast as 30 miles per hour over rutted roads without damaging it further. You can keep perfect control in traffic or on sharp turns. The chains can't slip. The length of the bars can be regulated individually. A firm hold can be taken 'most anywhere on the wrecked chassis. Full details given in our illustrated broadside. Send for a copy. There's money in it.

Ernest Holmes Co.
Chattanooga, Tenn.

Here is a gripping story of profits



"Resizing cylinders is a simple job—now. A mechanic's helper can do it. You don't take off the engine bloc—you don't send it out. You just clear the cylinders.

"Then you attach the Auto-Hone to your electric drill—slip it into the cylinder—and turn on the power. In fifteen to twenty minutes a cylinder is resized. All traces of ring travel, taper, unevenness—are gone. The cylinder surface is so smooth and polished that the car owner can step on the gas and let her out. No breaking in.

"Yes, sir—it's a money maker. It's a gold mine for the garage and service station."

Garage Owners—Service Stations—Repair Shops—send in that coupon today.



No skilled help is required to operate the Auto-Hone.

Any mechanic's helper can resize cylinders with it—it is so simple and effective.



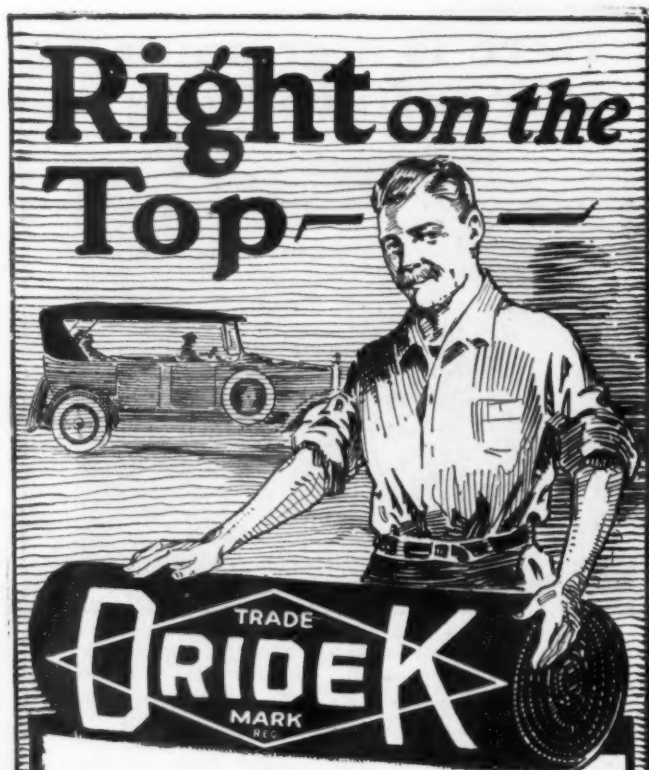
The AUTO-HONE CO., 1587 Main St., Buffalo, N. Y.

Gentlemen:

Please send at once complete information and prices of the Cylinder AUTO-HONE. This does not obligate me in any way.

Name

Address City..... State.....



**Right on the Top
well expresses Dridek
quality in every way.**

Absolutely waterproof, can be folded and creased without marring the surface and it stands up under the most continuous kind of hard wear.

Every yard in every piece is carefully inspected both in the finish and in the fabric used and the quality is always the same.

Place your orders where you get your money's worth in service and satisfaction.

Dridek makes the ideal automobile top.

Send for samples
and prices.

L. J. MUTTY COMPANY

Boston

Dept. C

Mass.



**Save time, increase sales with
advertising road maps.**

INCREASE sales and accumulate "goodwill" by distributing RAND McNALLY Advertising Road Maps. Thousands of the leading concerns in the automotive industry are using this type of advertising successfully—automobile, tire and accessory manufacturers, garages and service stations. And so can you!

One hundred per cent of your customers are going somewhere. All are interested in maps and many inquire about routes and the location of garages and service stations. Give each customer a RAND McNALLY road map in a cover bearing your advertising. 100 per cent interested circulation!

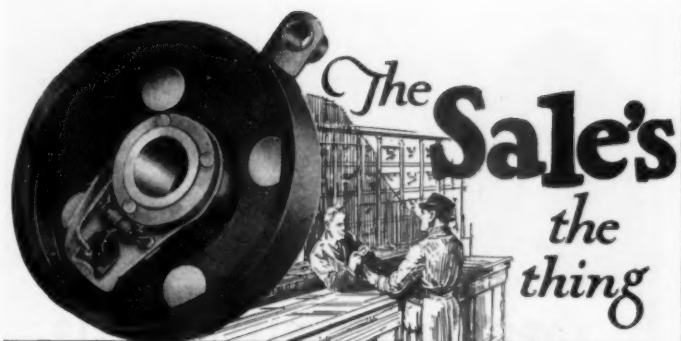
And you secure the lasting patronage of the motorist, for you have done him a real service. You have saved the time of your employees by answering the customer's inquiry in the quickest, most intelligent way.

You can use RAND McNALLY Official Auto Trails Maps in covers prepared especially for you, or a special territory folder of the section in which you operate. The expense is surprisingly small. RAND McNALLY Advertising Road Maps may be bought economically in small quantities!

*Write for sample Advertising Road Maps.
Let us explain in detail how profitable
this type of advertising can be to you.*

RAND McNALLY & COMPANY

Dept. Q-53, 536 S. Clark Street, Chicago



Bell Merchandising Methods Speed Up Timer Sales—

JOBBERs and dealers who handle the Bell Timer sell an exceptionally well made device: true—rugged—leak-proof—with features that guarantee perfect electrical contact through long, uninterrupted service.

For example, the case is made of Bakelite: waterproof, dustproof. Contacts are copper to copper: minimum wear. The self-adjusting contact shoe on the rotor is so constructed that it must maintain even pressure against the raceway—compensating for all irregularities of cam shaft motion.

In short Bell offers the trade a fine timer—full merchandising co-operation, striking sales helps, an attractive display stand for dealers, reasonably priced, liberal discounts.

Bell Timers are sold with a consistent merchandising policy and it will be well worth any jobber's, or dealer's, time to write for the details of our interesting offer.

BELL MANUFACTURING CO.

11 Elkins St.,
So. Boston, Mass.

List Price \$3

This non-obstructive display stand should be on the counter of every man who sells timers. It enables patrons to inspect Bell construction closely, demonstrates wiping motion of rotor brush on raceway contacts, shows the other features at a glance—and invites many profitable inquiries.

**The BELL
Timer**



**"Go Ahead—
Install It!"**
Says Every Ford Owner

Every Ford owner wants to give his car more power on hills, get more gas mileage, eliminate rear axle noise. So call their attention to Bantam Thrust Bearing F-40 and in 9 cases out of 10 you will get the "high-sign" to go ahead.

Years ago, all Fords had a thrust ball bearing each side of the differential. Now they have only plain washers. When these wear, the ring gear moves away from the piston—and there is noise or breakage.

Bantam F-40 overcomes this. Owners report 10, 15, 20,000 miles without rear axle trouble. It is in no sense a cheap bearing, but is good enough for any car.

Your distributor carries F-40 in stock. If he cannot supply you, write direct to one of the addresses below.

BANTAM
Ball Bearings

Bantam Ball Bearing Co.

Pioneer Manufacturers

Bantam,

Conn.

Detroit Office
905 Dime Bank Bldg.

Mr. F. M. Boyd, The Avon, 6 East Read St., Baltimore, Md. Frank M. Cobbledick Co., 1031 Polk St., San Francisco

CIRCLE "S" AUTOMATIC WINDSHIELD CLEANER

**Price
\$5.00**

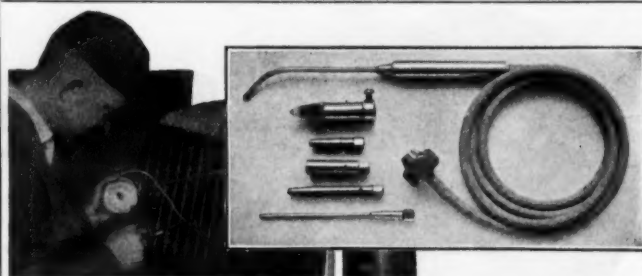
**Every Car Owner
Will Want A
Circle "S" Cleaner
When You Tell Them**

Its mechanism is simplicity itself—It has no pistons, rods or vanes—No packing to dry out—That it has no friction producing parts to use up power—That it can be operated by hand from inside the car—That all adjustments are made from inside the car—That the pressure of the squeegee against the glass may be varied or entirely released—That it is practically wear proof. That it sells for \$5.00, little more than the cost of a good hand cleaner.

Dealers and Jobbers—Write today for sales possibilities.

F. W. STEWART MFG. CORP.
347 W. Austin Ave. Chicago, Illinois

Manufacturers of the well known Circle "S" Swivel Joints



TORIT TORCH OUTFIT NO. 13 Does Soldering in $\frac{1}{4}$ the Usual Time

Whether the job is lead burning, battery sealing, fender straightening, radiator soldering or loosening a rusty or corroded nut, the Torit, No. 13, torch is always ready at a second's notice to serve you, and the price is wonderfully low. It is handy for soldering tinware, babbiting, joining light tubing, aluminum soldering, soldering electrical connections, etc.

USES ACETYLENE ONLY

A splendid use for discarded auto acetylene tanks. Many owners make the Torit, No. 13, pay for itself in a single day. Torch, with 4 different tips, soldering copper, 5 ft. tubing and connection for auto acetylene tank.

\$7.50

ORDER YOUR TORCH TODAY

St. Paul Welding & Mfg. Co.
169 W. Third St., St. Paul, Minn.



Sold on
Easy Terms

Get the Fox Booklet

If you are not equipped to bore and grind cylinders in your shop, investigate the Fox lathe attachment. It is a low priced outfit that does high grade work. It is a business builder and a money maker. It turns your lathe into the most profitable piece of equipment in your shop. The attachment can be put on or taken off of your lathe in ten minutes. Write for complete descriptive booklet today.

SUNDERLAND

Machinery and Supply Co.
Machine Shops

Omaha

U. S. A.

High Grade Work Builds Your Business

A satisfied customer is your best advertisement—he helps you *build* your business! The Eagle Aligning Fixture—Universal or Special—helps you turn out repair work that brings *repeat business*.

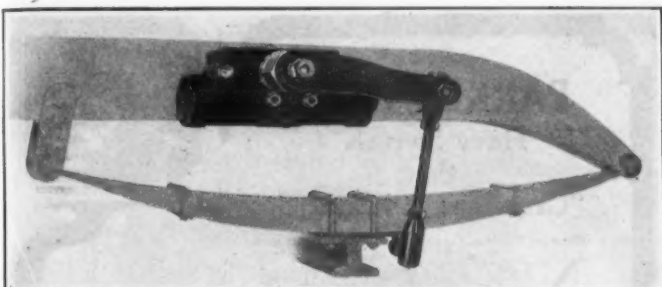
Check pistons and rods for accuracy on an Eagle before they go back into the motor and you know that no knocks will develop. Also there will be no *oil pumping*—and your customer's mileage will be increased. He will appreciate your careful service.

The Eagle Aligning Device has many distinct advantages for you. Write us today for descriptive literature—or ask your Jobber!

Eagle Machine Co.

24 N. Noble Street
Indianapolis, Ind.





Demonstrate

**How It Fluid Cushions
Against Road Shocks**

Demonstrate to your customer, on his own car, how the oil-cushioning mechanism of this super-shock absorber automatically adjusts itself to road shocks. Controls the most violent rebounds as well as ordinary vibrations—so that the car floats even over the roughest going.

That's the easy way to sell the Hydraulic Control—for substantial profits.

High-class Distributors Wanted

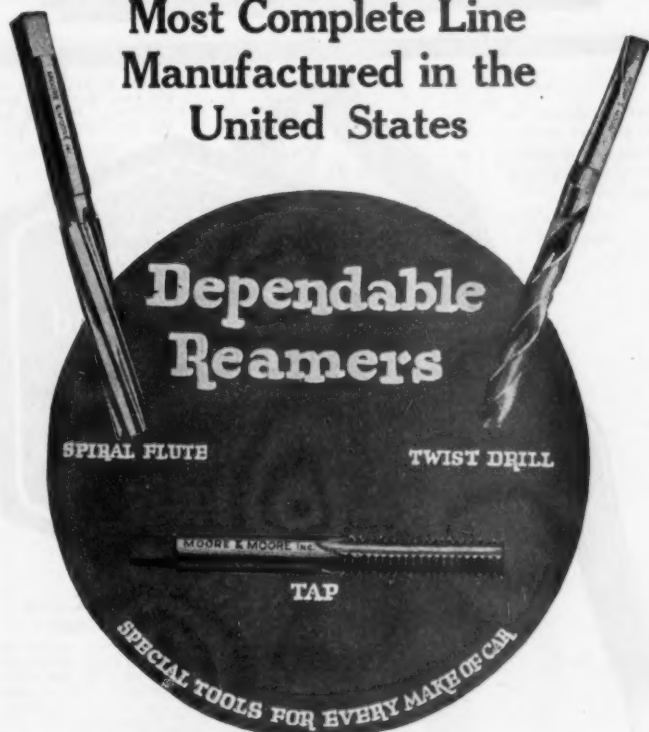
Auto Spring Control Co.

11-21 HARRISON STREET JAMESTOWN, N. Y.

THE **HYDRAULIC CONTROL**

A Shock Absorber—PLUS

**Most Complete Line
Manufactured in the
United States**



Moore & Moore, Inc.

Reading, Pa.

MOTOR AGE

is a

"Member of the A.B.P."

To you, this is a fact of especial significance, for it means that this publication is part of a concerted movement to raise the level of publishing practice, to assure better service to both subscribers and advertisers.

The "A. B. P." is built upon and revolves around the following set of standards—

STANDARDS of PRACTICE

THE publisher of a business paper should dedicate his best efforts to the cause of Business and Social Service, and to this end should pledge himself—

1. To consider, first, the interests of the subscriber.
2. To subscribe to and work for truth and honesty in all departments.
3. To eliminate, in so far as possible, his personal opinions from his news columns, but to be a leader of thought in his editorial columns, and to make his criticisms constructive.
4. To refuse to publish "puffs," free reading notices or paid "write-ups," to keep his reading columns independent of advertising considerations, and to measure all news by this standard: "Is it real news?"
5. To decline any advertisement which has a tendency to mislead or which does not conform to business integrity.
6. To solicit subscriptions and advertising solely upon the merits of the publication.
7. To supply advertisers with full information regarding character and extent of circulation statements, subject to proper and authentic verification.
8. To co-operate with all organizations and individuals engaged in creative advertising work.
9. To avoid unfair competition.
10. To determine what is the highest and largest function of the field which he serves, and then to strive in every legitimate way to promote that function.

Publications which have subscribed to these standards have earned the preferred consideration accorded them.

**THE ASSOCIATED
BUSINESS PAPERS, INC.**
220 West 42nd St., New York

There's One

for every car. That is, **GLOBE Tool and Battery Boxes** are made in thirty styles and sizes.



Over ninety thousand motorists bought them last year and the dealers who sold them to motorists made good ample profits.

You, too, can sell them profitably. Order a stock from your jobber now.

The Globe Machine & Stamping Co.

Cleveland, Ohio

World's Largest Manufacturer of Tool and Battery Boxes, also Stop Signals

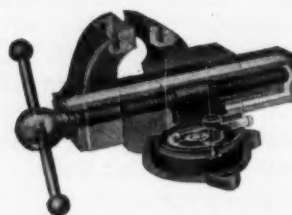
PARKER VISES

Have Swivels that
"Grip Like a Grizzly"

One of Seven Superior Parker Features

NOT a mere clamping device but a swivel base with the strength of a solid back jaw. Tightening the wedge expands the ring to a gripping power 360 degrees of the base.

Let us send you our "Feature Folder" No. 9 and full information about Parker Vises for garage work.



The
Charles Parker
Company
Master Vise Makers
Meriden, Conn.
U. S. A.

PARKER

VISES

Grip Like a Grizzly



TORPEDO SETS A SALES RECORD



Note the unique construction of the core. The porcelain tip is ball shaped to prevent radiation of heat, thus burning off any oil-drops that should possibly get inside the closed end. The only real fouling preventer.

LET us explain to you how during the brief period since announcing Reflex Torpedo Spark Plugs—the plug designed to dispense with oil pumping motor-ills—dealers are increasing their sales 400%—500%.

TORPEDO REFLEX PLUGS

are of closed end type with special constructed cores—right at home in oil pumpers. A chart of spark plug sizes, for all motor conditions, indicating the proper plug to use, is sent you free of charge regardless of the make of plugs you sell. Special advertising material that sells your customers on this new idea, generously supplied.

Prices Lower—Profit Greater

THE REFLEX IGNITION COMPANY

3068 West 106th St.

CLEVELAND, OHIO

Since 1909—Makers of Spark Plugs Supreme

THERE IS A SPECIFIC REFLEX PLUG FOR EVERY MOTOR CONDITION



Normal Motor



Hot Motor
Light Duty



Hot Motor
Heavy Duty



Oil Pumper

Sell quickly at \$3.60 (set of 12). You get installation job and extra profit.

Patented

Accept no substitute. Insist on Genuine Apex Innerings. Demand seeing our guarantee tag.



APEX
Innerings
Inside Piston Rings

Guaranteed
To Stop Oil
Pumping and
Piston Slap
Or Money Back

Thomson-Friedlob Mfg. Co.
PEORIA, ILL.

Rebuild Used Cars at Trifling Cost

Merely slip Apex Innerings under the regular piston rings and form power-and-oil-tight contact between piston ring and cylinder wall. Don't rebore. Rebuild trade in cars; stop piston slap, oil pumping, excessive carbon—then resell at big profit. Apex Innerings give used, old and worn auto, truck, tractor, farm light plant, stationary and marine motors new power, more pep.

Retail price 30c ea. up to 1/2" wide or 5" dia. (larger 50c ea.) All sizes. If jobber has none order complete stock direct. Order like piston rings; give sizes wanted. Usual trade discount.

Jobbers—Apex Innerings offer a fast selling line with quick turnover. Get facts and names of big jobbers now handling

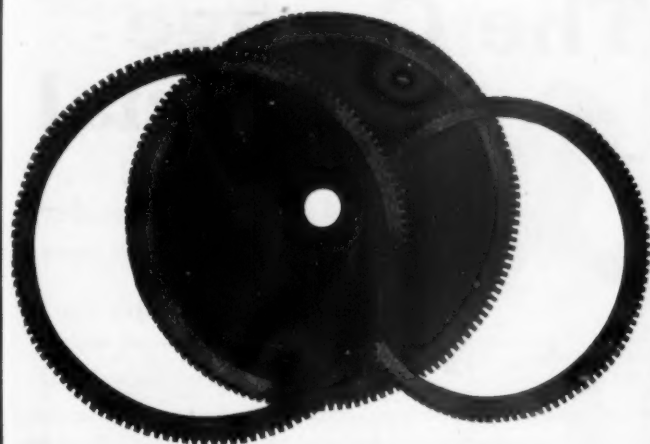
THOMSON-FRIEDLOB MFG. CO.

Peoria

Dept. C

Illinois

Chicago Branch: 2332 S. Michigan Ave.



Get Meachem Prices on Fly Wheel Rings

Quantity production of highest quality fly wheel ring gears enables us to quote surprisingly low prices. Write for price list. Ten thousand in stock for immediate delivery.

THE MEACHEM GEAR CORP'N
Syracuse, N. Y.

Norman flexible PISTON RING

A Good Piston Ring Must be Flexible



Full flexibility is secured in the NORMAN FLEXIBLE PISTON RING by the exclusive method of graduated peening (deepest opposite the joint).

The NORMAN joint is also a worthy feature. Rounded ends prevent breakage when installing.

Every NORMAN FLEXIBLE PISTON RING is single cast, heat treated, oil tempered, pressure peened and accurately machined.

Literature, discount terms and full information will be sent on request.

NORMAN MANUFACTURING COMPANY
Davenport, Iowa

Yet They Are Not
High Priced Rings

2 1/2" up to and
including 4"
60c

Over 4" up to
& including 5"
80c

The Ultimate Way WET INTERNAL GRINDING

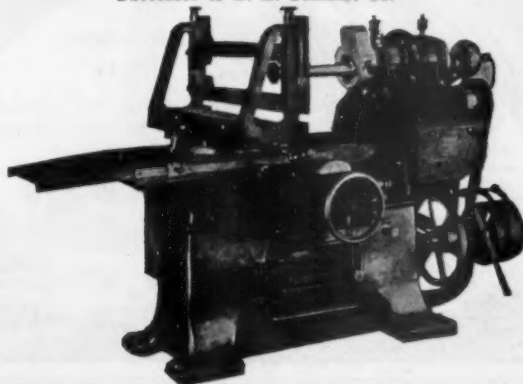
Wet grinding, as made possible by the Micro Internal Grinder, is as far in advance of ordinary dry grinding as the present day automobile is over the old ox team.

Micro

The Micro is a highly developed type of internal grinder adaptable for either wet or dry grinding, at the option of the operator, permitting highest quality of results. Its automatic action, both as to cut, feed and table travel provides the most accurate work humanly possible in exceptionally quick time.

If you're going to get a grinder, get the kind that will pay you biggest returns. Our bulletin gives full information—send for it.

MICRO MACHINE COMPANY, Bettendorf, Iowa
Successor to B. L. Schmidt Co.



1200 MODELS IN STOCK

A stock like
this to draw
from gives any
Spring Service
Station the "edge"
on competition

AMERICAN AUTOPARTS CO.
9775 FRENCH ROAD DETROIT

AMERICAN Springs

ANY CAR ANY MODEL ANY YEAR

PARANITE CABLE

Best for Automotive Work

We carry at all times a complete stock of every kind of cable used for automotive work. Many years of specialization have brought **PARANITE** Cables to the highest state of perfection. The finest grades of rubber compound, cotton and flexible enamel varnish are used.



FOR 33 YEARS THE STANDARD
IF IT'S PARANITE IT'S RIGHT
Quality jobbers handle quality cable—that's **PARANITE**.

Indiana Rubber & Insulated Wire Co.

210 S. Desplaines St., Chicago
Factory and General Offices—Jonesboro, Ind.

The Garage Special



Electric Drill and Valve Grinder

That saves every garage or repair shop time and money.

Louisville Electric Mfg. Co.

Incorporated

Louisville, Ky., U. S. A.

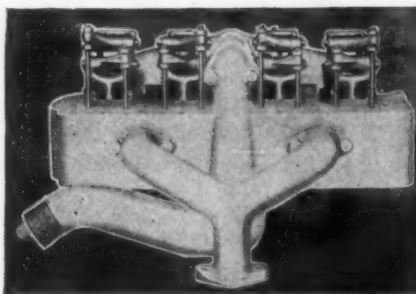
C. E. Willey, Pres. J. B. McFerran, Secy-Treas.

It will do the work.

ROOF 16 OVERHEAD VALVE EQUIPMENT

For Ford and Dodge Motors

ROOF 8 VALVE HEAD FOR FORD MOTOR



Stupendous Power—
Lightning Speed

Ford racing cars with Roof Equipment are rivals on mile and one half mile tracks of the highest priced racing cars. Doubles the pulling power of the Ford or Dodge pleasure car or truck. Hill climbing and general road work beyond wildest dreams of the owner. Complete — ready for installation — no machine work necessary. We are headquarters for all speed equipment. No matter what you want, write us. Racing quality — lowest prices. A postal card brings you complete list of our specialties.

Jobbers—Dealers—Consumers—Write Us

THE LAUREL MOTORS CORPORATION, ANDERSON, INDIANA

New Departure Ball Bearings



Tip your coppers with Ruby as a flux for brass, steel, copper or galvanized iron, use Ruby full strength.



For All Metals



Rubyfluid

Combination
SOLDERING & TINNING FLUX

THE RUBY CHEMICAL COMPANY

68-70 McDowell St.

Columbus, Ohio

Free Trial Sample Sent
At Your Request

WHEN ALL advertisers demand their money's worth, all publications will provide circulation reports verified by the Audit Bureau of Circulations.

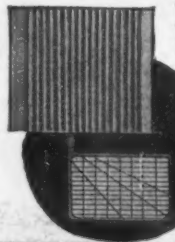
It is one of the mysteries of the advertising world that while all manufacturers demand verification of weight and quality in the material purchased, some of them still buy advertising space without knowing what they are paying for.

Such advertisers, however, are now exceptional. Most of them demand verified A. B. C. circulation statements before placing contracts.

In the case of MOTOR AGE, the demand is immediately met.

It is a member of the Audit Bureau of Circulations.

BATTERY



REMEMBER all the battery repairs you've made? Remember how important good Separators are? Cheap, untested Separators have spoiled many a good Battery. **FERRY'S** Guaranteed Battery Separators—Chemically treated for long service. Cost no more than ordinary ones. **FERRY'S** Battery Plates. High Capacity Special material to overcome sluggishness. **FERRY'S** Burning Rack. Complete with spacing guide. Like cut or with wood base. Also Battery Boxes, Acid Proof Paint, Sealing Compound. Write for particulars, prices on all Battery Supplies.

Ferry Mfg. Co., 2119
S. 4th St., St. Louis, Mo.



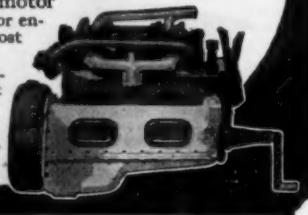
SEPARATORS

Waukesha High Torque Motors

Capable without exception. Powerful without wasteful speed. Known from coast to coast, and demanded by that class of motor owners who recognize true motor endurance and reliability under most exacting conditions.

Manufacturers, there's a Waukesha Motor of a size to suit your heavy duty requirements. Write us.

Waukesha Motor Co.
Waukesha, Wis.



OVER 50,000 MILES NOW REPORTED ON "WHITNEY"

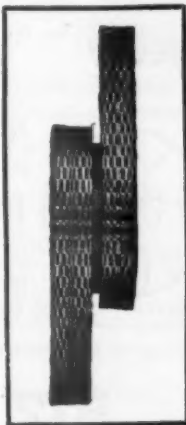
High Efficiency

FRONT END MOTOR CHAIN DRIVES
AND STILL IN GOOD CONDITION



NOT ONE OF
THESE
CHAINS
HAS BEEN
KNOWN
TO SKIP A
SPROCKET
TOOTH

Interchangeable
on the
Sprockets
Furnished with
the Car



The Whitney Mfg. Co.
HARTFORD, CONN.

JOHNSON Combined Gas Torch and Soft Metal Melting Pot

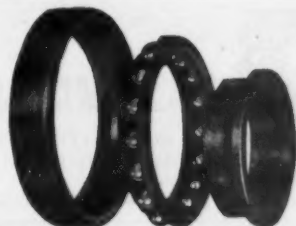
For melting lead, babbitt, solder, zinc, etc. Pot holds 25 lbs. of metal. Torch used for heating soldering irons or any pre-heating work.

Has the Johnson Direct Jet Bunsen Burner with shut-off valve and pilot light.

This Burner will produce a flame temperature of 2250° without the use of any forced air blast.

Write for descriptive literature of Gas Appliances.

JOHNSON GAS APPLIANCE CO.
Cedar Rapids IOWA



The Bearings Company of America—manufacturers of Thrust Ball Bearings, Angular Contact Radial Bearings, Angular Contact Thrust Bearings—Bearings made to your B/P's and requirements—Your present Bearing sizes duplicated.

The Bearings Company of America,
Lancaster, Penna.

Detroit, Mich., Office,
1012 Ford Bldg.



Secret of Its Triumph in New Locking Device

A windshield Cleaner that is winning wide favor because it embodies all the features of a good cleaner—plus a new locking device that makes for quick responsiveness, a firm, effective stroke, and long service.

MALCO Universal Windshield Cleaner

Because it can be clamped on or bolted thru hole of windshield frame of any make or model of car, dealers are finding it profitable to standardize on MALCO. It reduces capital tied up in stocks and results in quick turnover.

Ask your Jobber's Salesman about the Malco Line of products or write us direct, sending name of your jobber.

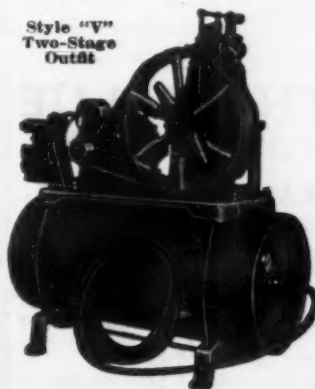


Malco Products Corporation
220-24 West So. Temple, Salt Lake City



CURTIS SINGLE AND TWO - STAGE AIR COMPRESSORS

Style "V"
Two-Stage
Outfit



CURTIS is recognized as a pioneer in the air compressor field. Sixty-nine years' manufacturing experience, twenty-six of which have been devoted to pneumatic machinery, has enabled us to develop compressors entirely original in design. As a result, Curtis Outfits have many exclusive features that assure dependable service with minimum upkeep.

Get the Facts

We manufacture a complete line of single and two-stage outfits—a size, style and arrangement to suit your needs. There are definite reasons why you should insist on a Curtis. Write at once for full details—our proposition and prices.

**CURTIS PNEUMATIC
MACHINERY CO.**

1527 Kienlen Ave., St. Louis, Mo.

Branch Office:
530-H Hudson Terminal, New York City

Canadian Representative:
Joseph St. Mars, Winnipeg and Toronto, Can.

FIRST AND ONLY Two-Stage Compressor with a Copper Intercooler

An Original Design
The efficiency of a two-stage compressor depends on how thoroughly the air is cooled in the intercooler. Copper throws off heat faster than any other metal—it is used exclusively on Curtis intercoolers, thus assuring fullest advantage of two-stage compression.

COMPLETE INFORMATION

On Automotive Cables, Description—
Sizes—Diameters, Classified as to Serv-
ice—Fully Illustrated Will Be Found in
the Current Issue of

Automotive Equipment Association Catalogue.
The Automobile Trade Directory.
Chilton Automobile Directory.

The Packard

Electric Company

WARREN,
OHIO



STORM

Automatic Cylinder Finishing Machines

Are speedy and accurate, self-centering and automatic. Produce a "gun-barrel" finish for close piston fitting. Ideal for grinding or honing after reaming or boring, or for refinishing alone where wear is slight.

STORM SELF-CENTERING FINISHING HEADS may be used with electric drill or drill press.

Write for new book on Modern Cylinder Methods.

STORM MFG. CO. Dept. A
406 Sixth Ave., So. Minneapolis



Martin Auto-Hoists

See our full-page announcements in the January 24th and February 7th issues of Motor World and the January 4th and January 25th issues of Motor Age.

THE T. A. MARTIN EQUIPMENT CO., Inc.
Bridgeport, Conn.

EARL

THE VALUE of TODAY

EARL MOTORS, INC.
Jackson, Michigan



Tasco Visible Gas Gauge For Fords

Tells instantly supply of gas. Simply insert instead of regular gas cap. Retail for \$1.00. Every Ford owner wants one. Order from jobber or direct.

LIBERAL DISCOUNT

The Akron Selle Co., Akron, Ohio



YAHOOTTA

Let your customers hear the
Sparton speak!

Special display heard given free with initial order for six. Write for complete particulars. The Sparks-Withington Co., Jackson, Michigan

Gill-Special-Servus

Piston Rings for Every Need

GILL MFG. CO., 8300 South Chicago Ave., Chicago



\$35 Brings Your Shop GUARANTEED
FREE AIR SERVICE
With HB Automatic Twin Compressor

New business gained by improved service easily pays balance. Day and Night HB Air Service pulls trade. QUIETEST OPERATING outfit on the market. Entirely automatic. Maintains 120-140 pounds 24 hours per day. 4 cubic feet capacity. Fully equipped. Easy terms. Write HOBART BROS. CO., Box AR 363, Troy, Ohio.

Absolute Satisfaction Guaranteed or Money Back



POMEROY GASIFIERS AT COST

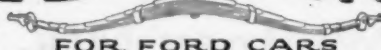
in unoccupied territory
MR. DEALER: We want YOU to profit the same as 1000 other dealers have in selling the

POMEROY PATENTED GASIFIER

SUMMER VALUE ALSO.—Just ask on your letterhead for our "Get Acquainted" offer—ONE UNIT AT COST FOR YOUR PERSONAL USE. References: Any Rochester, N. Y., jobber. Cars in your territory will appreciate the service value of PRIME WITH HEAT.

POMEROY ELECTRIC CO., Inc., Mfrs., 44 E. Main Street, Rochester, New York

E-Z SPRING



FOR FORD CARS

Makes riding and driving a pleasure. Eliminates road shocks and hard steering, spring breakage, shock absorbers. Write for our money making dealer proposition.

W. D. LOWE & CO.

204 Mound St.

Columbus, Ohio

Send
for
Catalog

TESTING EQUIPMENT FOR ELECTRICAL SERVICE STATIONS

P. J. DURHAM CO.
244 W. 49th St. New York City



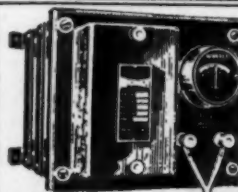
SAY "W. & C."

and Your Jobber Will Give You the
Most Successful
Time-Tried Shock Absorber for Fords

W. & C. Shock Absorbers Sell
P. H. WEBBER COMPANY

Hoopeston

Illinois



Automobile and Radio batteries charged for a nickel. Ten million car owners and five million radio fans are prospects for

THE HOMCHARGER

BIG PROFITS. WRITE NOW.

The Automatic Electrical Devices Co.
122 West 3rd St. Cincinnati, Ohio

a profit earner for YOU

Beacon Visible Gasoline System

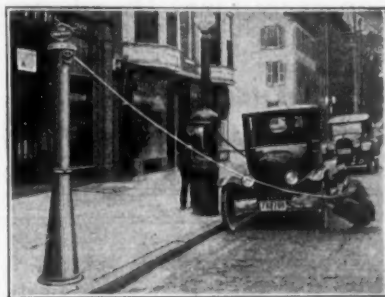
Double check. Pay only for the gas you get. Makes satisfied customers. Write for catalogue.

BEACON VISIBLE PUMP CO.

Louisville,

Incorporated

Kentucky



This outside curb type only \$48.50

A Complete Line of Air and Water Stations

Three types to choose from — all reasonable in price. A Business Getter, and built to stand the gaff of public use. List prices range from \$19.50 up. Send for illustrated literature.

MANLEY MFG. CO., YORK, PA.



No. 1

Why This Single-Acting Long-Barrel Pump Sells Fast

Car owners want a pump that will give them the desired air pressure with as little work as possible. And this is a decided point in favor of the Springfield No. 1 Single-Acting Tire Pump. No effort on the "up pull"—intake stroke. And on the downward—charging stroke, the motorist works in a natural position; reducing effort to a minimum.

Springfield construction insures a large charge at each working stroke. 27 in. steel barrel—26 in. hose, tested at 200 lbs. — malleable iron base with ball air check.

Learn the other features from our interesting data—sent on request.

THE SHAWVER CO.,

Springfield,

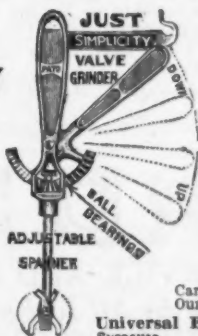
Ohio

Just use a natural, easy pump action to grind valves

SIMPLICITY VALVE GRINDER

Price

\$2.50



The simplest, sturdiest speed grinder made — so designed that you can do with it whatever the hardness, size and conditions of the valve requires.

With a natural, easy pump motion, the Simplicity Valve Grinder furnishes the repair man with a tool that turns out a finished job quickly and effectively. Its oscillating motion insures an even pressure on the valve at all times. Stroke never stops twice at the same place. There is no complicated series of gears, cams or pins to wear out.

Carried in stock by all jobbers. Our literature gives the details.

Universal Equipment & Supply Co. SYRACUSE, N. Y.

TURNER QUALITY

GUARANTEED

Axle Shafts

Propeller Shafts

Pinion Shafts

Pump Shafts

Spring Shackle Bolts

Piston Pins

Fan Bolts

Spindle Bolts

Buick Valve Lift Assembly with Guide
for Passenger Cars and Trucks Sold Thru The Jobbers

The Turner Machine & Mfg. Co., Kansas City, Mo.

E-C-L Pistons

ALUMINUM ALLOY NON EXPANDING



How to Eliminate Piston Slap

Piston Slap is a common and vexatious cause of engine trouble which in the past has bothered most car owners.

But it can now be eliminated.

With the E. C. L. Aluminum Alloy Non-Expanding Piston, E. C. L. Pistons may be fitted with a closer degree of clearance than cast iron pistons. They reduce the consumption of gas and oil — increase power and speed and eliminate spark knocks.

Let us tell you more about this remarkable piston. Write for the details today.

E. C. LONG

Main Office and Factory

4834 Beaubien Street

Detroit, Mich.

Donnelley Has Indexed the Automotive Market

OUR files contain complete statistical information covering national, state, county and town counts on automobile owners. Lists show make of car owned.

Consult Donnelley for accurate mailing lists or statistical information regarding either auto owners, auto or accessory manufacturers, dealers or repairers. Our free book "Automotive Markets and How to Reach Them" tabulates complete data available. This book is a gold mine of information on the automotive markets. Ask for your copy today.

The Reuben H. Donnelley Corporation

Mailing Service Department

334 E. 21st Street

Chicago, Illinois



SAFEGUARDS
AGAINST
THIEVES

POWERSTEEL
AUTOWLOCK

REGROUND BEARINGS

OUR REGRINDING PROPOSITION
WILL CUT DOWN YOUR BALL
BEARING BILLS. TRY US AND
BE CONVINCED. SATISFACTION

GUARANTEED

AHLBERG BEARING COMPANY

317-427 EAST 26TH ST CHICAGO, ILLINOIS.

ATLANTA
BOSTON
CLEVELAND
DETROIT
KANSAS CITY
LOS ANGELES
MINNEAPOLIS




NEW YORK
PHILADELPHIA
PITTSBURGH
PORTLAND, ORE.
PROVIDENCE
SAN FRANCISCO
ST. LOUIS - ST. PAUL

WEIDENHOFF PRODUCTS
Electrical Testing Equipment
Universal Test Benches, Growlers, Magnetizers, etc.
Write today for Bulletin M-18.
4358 W. Roosevelt Rd., Chicago, Ill., U.S.A.



Monogram Light Distributors
Standard Equipment on 30
of America's Foremost Cars
Write for Prices.
MONOGRAM LENS CORP.,
1834 Broadway, New York



RUBY

**Cut-Outs
Match-Ash Holders
Accelerators**
Excel in merit. You profit by
knowing them. Ask us!!!
THE RUBY MFG. CO.
SPRINGFIELD, OHIO

No Springs
No Auto-
matic
attachments
No adjust-
ments.

Omac
constant-unit
CARBURETOR

Simple
Positive
mechanical
action.

6 TO 12 CARBURETORS IN ONE
Jennings Corporation, Homewood Station, Pittsburgh, Pa.

Garage Men and Accessory Dealers Want "Sav-Oil"
"The Only Ring With a Mileage Guarantee"
"Sav-Oil" is stamped inside of every ring
THE SAV-OIL RING MFG. CO.
1037 S. Figueroa St. Los Angeles, Calif.

KISSEL The Aristocrats of
Motordom
7 Models-Open and Closed
Distributors in principal
cities. Open territory now
being closed.
Kissel Motor Car Co.
Hartford, Wis.

The Custom Built Car



FEDDERS

Of the Same
Genuine Fedders
Quality
which has made Fedders
Radiators standard equip-
ment on America's finest
cars.

Radiator Cores for
Replacement
Can now be had
FEDDERS MANUFACTURING CO.,
BUFFALO, N. Y.

There is a Harvey
Steel Disc Wheel in
the various styles
which we make for
each size of car at
interesting prices.

HARVEY

Rim & Wheel Co., Inc.
25 E. Jewett Ave.,
Buffalo, N. Y.




Be the local Logan
Man—Let us show
you how easy and how
profitable it is to in-
stall Logan Ring
Gears.
Kauffman Metal Products Co.
Bellevue, Ohio

**LOGAN FLY
RING GEARS**



WHY PULL THE MOTOR?
The C. A. ADJUSTABLE CENTER BEARING CAP
Corrects end-play in FORD crankshaft and sets
magneto to give full efficiency, without removing
the motor from the car. Installed in a few min-
utes and GUARANTEED TO WEAR FOR ONE
YEAR. Retail price, \$3.75. If your jobber or
dealer cannot supply you, write us. Address
Dept. M.
ADJUSTABLE BEARING COMPANY
BRAZIL, IND.



The
**NATIONAL COLLAPSIBLE
RIM**
"On and Off in 30 Seconds"
NATIONAL COLLAPSIBLE RIM CORP.
250 West 57th Street, New York City

BURD Piston
Rings
EXCEL IN SERVICE AND EFFICIENCY
Sold by All Jobbers
BURD HIGH COMPRESSION RING CO., ROCKFORD, ILL.

Welco Products Are Quick Sellers
All-Size Step Plate fits all running boards by simply moving toe plate
forward. Welco Ford Accelerator works independently of hand throttle; very
easy installation. Welco Blanket Holder keeps blanket securely on radiator
against strongest wind. Write for trade proposition.
WELKER MANUFACTURING CO., Middletown, Conn.

WELCO Products

The Borg & Beck Clutch
Over 1,500,000 in Use
Write for instructions for adjusting Borg & Beck Clutches.
The Borg & Beck Co., 920 S. Michigan Ave., Chicago

YALE


TRADE MARK
Reg. U. S.
Pat. Off.

**OILING SYSTEM
FOR FORDS**
JOBBERs are offered an
opportunity to cash in
on a strong advertising
and sales campaign on
a necessity Ford-owners
are glad to buy. Ask
for particulars.
ROLAND & KOCH
Successor to
THE YALE CORP.
44 S. Main, Los Angeles, Calif.



STEVENS TOOLS
OVER 50 WONDERFUL SHORT CUTS
IN NEW CATALOG T-105
ASK FOR IT
STEVENS & COMPANY
375 BROADWAY, NEW YORK

SPEED UP



CANEDY-OTTO MFG. CO.
Manufacturers of Automotive Equipment, Drills, Punches, Shears, Shrinkers, Countershafts, Grinders, Buffers, Forges, Blowers, Tuyo Irons and Blast Gates.
Main Office and Factory—Chicago Heights, Ill.
New York Branch—407 Broome St.



BLACKHAWK
Welded Wrenches




A complete line of socket wrenches including all standard models and many special designs. Write for latest catalog and price list.
AMERICAN GRINDER MFG. CO., MILWAUKEE, WISCONSIN
C. N. & F. W. Jonas, Exclusive Sales Representatives,
Transportation Bldg., Chicago

Auxiliary firing-chamber gives it the explosive power of a howitzer. Carburetor must be adjusted LEANER immediately. Overcomes oil self-cleaning. Retails \$1.
Distributors wanted.

NT
SPARK PLUG

With the Explosive Spark
THE T. N. T. SPARK PLUG CO.
Cleveland, Ohio



EVERYDAY—the Only Ring That Is Absolutely Locked

The EVERYDAY Master Lock locks the piston ring Edgewise—Widthwise—Lengthwise, just like a solid ring. You can't force gas—oil—power past the joint.
Write now for the Xtra Profit Plan on EVERYDAY Piston Rings.
EVERYDAY PISTON RING CO., Inc.
East Rochester, N. Y.

BOSCH
American Bosch Magneto Corpn.
Main Office and Works: Springfield, Mass.
Branches:
New York, Chicago, Detroit, San Francisco
Over 500 Service Stations in 500 Centers



Trade Mark Reg. U. S. Pat. Off.

TEST YOUR BATTERIES
by the Chart Method. Something New. Send for free booklet, today.

Allen-Bradley Co.
Electric Controlling Apparatus
281 Greenfield Ave., Milwaukee, Wis.



51-6/10 MILES ON A GALLON OF GAS

It is the official world's record-breaking test with Ford Touring car. The new 1922 Stromberg Carburetor and Hot Spot did it—made this marvelous mileage possible.
Tens of thousands of Ford owners are now obtaining more miles on a gallon—quicker getaway—easier starting—increased power and speed—all because of having their cars so equipped.
Live dealers are requested to write for facts pertaining to territory.
Stromberg Motor Devices Co.
64 E. Twenty-Fifth St. Dept. 27 Chicago, Ill.

SELL OIL FROM THE CURB

The Correct Measure Motor Oil Display Pump will increase your oil business. Handsome. Compels attention. Delivers 1/4 gallon in 12 seconds. Can be put on curb in morning—and back indoors at night. \$45 per unit. Write for details concerning this money maker.
CORRECT MEASURE
MOTOR OIL DISPLAY PUMP
Correct Measure Co., Inc. Rochester, Pa.




DOUBLE SEAL OIL-CONTROL-PISTON

This hook-shaped groove catches the excess oil and returns it to the crankcase through holes in the bottom of the groove. Oil troubles are unknown with this piston. Used by many car builders as standard equipment. Write for our dealer proposition.
Double Seal Ring Company
Gen. Sales Office, 2335 S. Michigan Ave., Chicago



WRITE FOR OUR BOOKLET

"The Testing and Repairing of Automobile Electrical Equipment as a Profitable Business," which explains the complete Elmco line and how to start and continue the over increasing business of giving up-to-the-minute electrical service. The profit-making possibilities of this business are also gone into at length.
The Electric Machine Company
337 W. Ohio St., Indianapolis, Ind.
N. F. Andrus, 404 Goldengate Ave., San Francisco



It cushions the shocks that rack a car
THERMOID-HARDY
UNIVERSAL JOINT
Manufactured by Thermoid Rubber Company, Trenton, N. J.

ALVORD QUALITY TOOLS


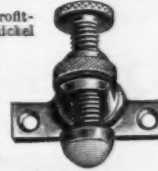


Taps, Dies, Cutters, Drills, Reamers
Send for Catalog
ALVORD REAMER & TOOL COMPANY
Millersburg, Pa.

WICACO Twin Cut Piston Ring—
With the Wandering Oil Groove
[pronounced WICK-A-CO]
WICACO
SCREW & MACHINE WORKS, INC., 4801 Stenton Ave., Phila., Pa.



JOBBER'S
Do not overlook these live selling and profitable items. The metal is brass, heavy nickel plated and will not rust.
Four styles—one for every car.
No. 503 with the Hump Base.
No. 504 with Ell Base. No. 505 Plain Lock-Type. No. 506 Swivel Lock-Type.
Packed fifty to carton; five display cards of ten each.
The company that took the rattle out of Anti-Rattles
THE AUTOQUIP MFG. CO., Inc. 495 St. Paul St., Rochester, N. Y.


MONOGRAM
The
Self Locking Radiator Cap



PERFECTION
SILENT DURABLE DEPENDABLE
Silent Timing
GEARS
WORLD'S STANDARD REPLACEMENT

PERFECTION GEAR COMPANY
1475 Michigan Ave. CHICAGO

STOPS GUESSING



Indicates definitely direction driver intends to turn. Signals at both front and rear of open or closed cars. Meets requirements of all State laws. Attractive—Durable—Effective. Dealers—Jobbers, write for details and territory. The Motor Products Co. Norwalk, Ohio

Traf-i-kop
SIGNALS RIGHT, LEFT, GO OR STOP



TARKINGTON MOTOR CAR

The dealer agreement has been written from the standpoint of a direct, permanent connection, liberal compensation and close co-operation in each dealer's personal territory. Photographs and full details will be sent on request.


TARKINGTON MOTOR CAR CO., Rockford, Ill.



LINENDOLL EXHAUST HEATER

Warms any car, open or closed. No odor, smoke, dust or noise. Easily installed, operated and cleaned. Sells quickly. Write for our attractive trade proposition.

THE NORWALK AUTO PARTS COMPANY
Norwalk, Ohio

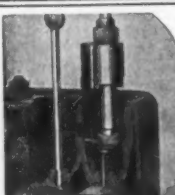


Sioux
Garage Tools
make well equipped shops. Ask your jobber.

Fast and ACCURATE for re-facing, reseating and grinding all size valves.

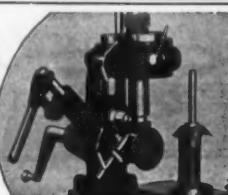
Sioux Flexible Shaft and Attachments take the tool to the work.

Albertson & Co., Sioux City, Ia.



The SPRITE
doubles Your Profits
Grinds All Valves and Valve Seats with an Emery-Wheel; Reaming Unnecessary; Cuts the Time in Half. Motor runs 15,000 r.p.m. Write for Free plan for making more money on valve work. Circular.

The Threm & Davis Co.
Toledo, Ohio




AIRCO IGNITION GAUGE

The Original Ignition Gauge Utilizing Neon
Instantly locates spark plug and other ignition troubles. Place it alongside the oil can for convenience. Test the spark plugs every time you oil the car. The motor will purr its appreciation.

\$1.00 with Clip and Screws
AIR REDUCTION SALES COMPANY
342 Madison Ave., New York, N. Y.
Pioneer in commercializing the elements of the air.



WARNER GEAR COMPANY
MUNCIE, INDIANA



CLUTCHES, TRANSMISSIONS, CONTROLS, DIFFERENTIALS



DO THE JOB RIGHT!
Keystone Expansion Piston Pin Aligning Reamers
Ask for 1922 Reamer Bulletin

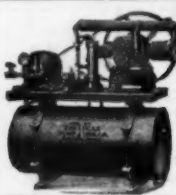
KEYSTONE REAMER & TOOL CO.
Chicago Millersburg, Pa. New York City



PETERS Crank Shaft Grinder
(Patented)
PRICE \$75.00

does perfect job without taking motor down. Rebabbitting unnecessary. Fits all sizes of crankshafts. No skill required. Send for circulars on this, also Peters Universal Bearing Reamer, Connecting Rod Bearing Reamer, Metallic Filler, Aluminum Brazing Solder.


PETERS ENGINEERING CO.
33rd Street and Woodland Ave. Phila., Pa.



DAYTON AIR COMPRESSORS

Automatic Control. Automatic Release.
Start against no load.
Style E-2: 2 3/4 cu. ft. per minute.
140 lb. pressure. Tank 16x36, 32 gallon.
25 ft. hose with air chuck. 1/2 H. P. Motor.

The Lucas Pump & Tool Co.
430 Valley St. Dayton, O.



MOTOR DRIVEN CHAIN HOIST
LIGHT—PORTABLE—STRONG

Can be hooked up and plugged in anywhere. And where electric current is not available, the hand chain can be quickly applied—and the hoist operated as an ordinary chain block. Saves men, money and time. Learn the interesting details.

MOTORBLOC CORPORATION
Summerdale, Philadelphia, Pa.

Twin-Spring BUMPER
FOR FORDS


A better bumper at a better price with Underwriters' Approval

NEW YORK WIRE & SPRING CO.
P. O. Box MA-43, Uptown Station. Hoboken, N. J.

COLEMAN
Quick-Fill Tire Pump
"More Air with less Strokes"

Write for Prices
The Coleman Lamp Co., Wichita, Kans.

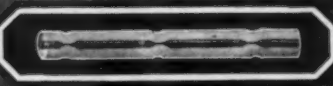
NO-LEAK-O PISTON RINGS
Won't Leak Because They're Sealed With Oil



"NO-LEAK-O"
No-Leak-O Piston Rings are making money for dealers everywhere. Their "oilSEALing" groove—found only in No-Leak-O—picks an oil film in between piston and cylinder walls like "packing" in a pump. Oil and gas stay where they belong. National advertising is helping the dealer sell No-Leak-O by teaching the motorist the lesson of more mileage on less oil and gas. It will pay you to stock No-Leak-O at once. Price 50c and up.

NO-LEAK-O PISTON RING CO., Dept. T-57, Baltimore, Md.

KESTER *and-Core Wire Solder*



"REQUIRES ONLY HEAT" **SAMPLE FREE**

CHICAGO SOLDER CO., 4701 W. 11th Ave.



WEAVER GARAGE EQUIPMENT

WEAVER MANUFACTURING COMPANY
SPRINGFIELD ILLINOIS U.S.A.
Send for Catalog



RED GIANT RIM TOOL

As we have reduced the price on Red Giant Rim Tools to \$3.25 to dealers, you cannot afford to let this opportunity pass to get a real rim tool at a cheap price.

Sold in every state in the Union, Canada, Mexico, Holland, Belgium, Denmark and the Hawaiian Islands. If your jobber cannot supply you, do not take something "just as good," but order direct.

RED GIANT TOOL CORP.
Lynchburg, Va.



UNIVERSAL HOSE CLAMP

Adjustable. Two sizes will clamp any hose of any diameter. Made from cold rolled steel out of wire. No rough edges to cut hose. Put on in less than a minute. Everlastingly leak-proof. Order Universal Hose Clamps. Trademark on every clamp and carton. Get them from your jobber—or write us.

UNIVERSAL INDUSTRIAL CORP.

Hackensack, N. J.



Like a Pocket in a Shirt

Has many uses. Drain crankcases, test tubes, scrub parts, carry tools, keep parts, throw scrap in it. One piece of heavy gauge galvanized steel. Won't tip over. List price \$2.50. West of Rockies \$3.00.

HANDI-PAN

Mfg. by
Robertson Bros. Mfg. Co.
5401 S. Western Ave., Chicago, Ill.

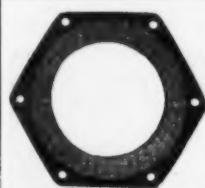
Sales Dept.
Standard Motor Parts Co.
1420 S. Michigan Ave., Chicago, Illinois



Write for particulars Wilkening Mfg. Co.

613 N. 15th St.
Philadelphia, Pa.

Exert an equal pressure on the cylinder wall at every point of its circumference



GUAY CLUTCH DISC & PLATE

For Dodge Bros. Cars

Models for other cars will be announced shortly. Extraordinary flexibility and durability are gained by passing every thread of asbestos over and under the steel fingers at a given length of 1/4 inch. Thus all strings are under the same measured spring tension. Steel and asbestos only materials used. No wires or rivets to cause uneven wear. Price of complete set, \$12.00. Good discounts to trade. Write for complete details.

JOHN C. HOOF & COMPANY
Mfg. Division 159 W. Illinois St., Chicago

Franklin

Air and Water Station

List Price \$58.50 Complete
FRANKLIN AIR COMPRESSOR WORKS
Norristown, Penna.

THE GRAND PRIX CAR DUESENBERG Original Straight Eight

Duesenberg Automobile & Motors Co., Inc., Indianapolis



Challenge WIPER

Distinctive in Appearance.
Most powerful in action.
Most durable in operation.
Sells on sight.

Berill & Co., Buffalo, N. Y.

\$6⁵⁰

GRINDING MACHINES



Cylinder — Internal — Surface
Grinders — Magnetic Chucks

THE HEALD MACHINE COMPANY

61 New Bond St., Worcester, Mass.

Branches in Various Cities

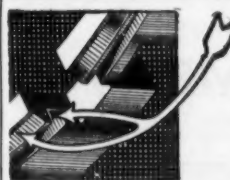


Kant-Skore PISTONS

WEIGH LIGHTEST - FIT TIGHTEST

Regrinders, Repair Men, Dealers
Write for literature, price list and liberal proposition. Prompt service and delivery on all standard and special oversizes up to .003. Over 600 models.

THE KANT-SKORE PISTON CO., Cincinnati, Ohio, and Kansas City



See the Beveled Edge and Oil Groove of the Universal One-Piece Piston Ring

Forced Lubrication Prevents Foul Plugs. The beveled top edge and central groove keeps oil from the combustion chamber—reduces carbon. Dealers—Write for the details.

UNIVERSAL MACHINE COMPANY
Baltimore, Maryland

H. G. Pare, 1412 S. Michigan Ave., Chicago, Ill.



Air Compressors; Gasoline and Oil Storage Systems; Heavy Metal Storage Tanks; Oil Burning Systems; Furnaces and Forges; Oil Filtration Systems; Water Softening Systems.

WAYNE TANK & PUMP COMPANY,
706 Canal Street, Fort Wayne, Ind.

Wayne

BROWN-LIFE-GEAR TRANSMISSIONS BROWN-LIFE-CHAPIN DIFFERENTIALS

Built at Syracuse, N.Y.

BLACK & DECKER

Portable Electric Tools

"With the Pistol Grip and Trigger Switch"

The BLACK & DECKER MFG. CO.

Towson Heights, Baltimore, Md., U. S. A.



SEE PAGE 5

The Bear Tractor

Write today regarding unassigned territory, and ask for catalog and distributor's and dealer's proposition.

Bear Tractors Inc., 5300 Park Place, New York City

The Tractor that Delivers its Power to the Drawbar

DIAL GAUGES

When you find Ames dial gauges in the finest automotive shops, on close limit work — there's a reason. Let us tell you why. Write TODAY.

B. C. AMES COMPANY
Waltham, Mass.



BOWSER

ESTABLISHED 1885

ACCURATE MEASURING PUMPS

S. F. Bowser & Co., Inc.

Home Plant, Fort Wayne, Indiana

Connecting Rods Rebabbed.

and rebuilt with new bolts and nuts, laminated shims, new pin bushings.

Information and prices on request.

WATKINS MFG. COMPANY
203 North Waco Street, Wichita, Kansas
INDIANA WATKINS MFG. CO.
21 West South Street, Indianapolis, Indiana

ALL STATES REBABBITTING SERVICE
3 East 4th Street, Waterloo, Iowa
WATKINS MFG. COMPANY
203 Wyoming Street, Syracuse, New York



U. S. ASBESTOS

Also Durabestos & Motobestos
BRAKE LINING

Unequalled in its Performance

Write us

United States Asbestos Co.

Manheim, Pa.

REID AIR SPRINGS



FLOAT THE CAR ON AIR
EASY TO SELL—EASY TO INSTALL
EXCLUSIVE TERRITORIES
BIG PROFITS

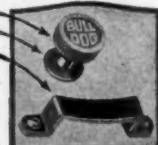
THE REID AIR SPRING CO. NEW HAVEN, CONN.



"Bull Dog" Foot Accelerators for Fords
A live article—in demand because it always makes good.

RUBBER COVERED PEDAL
MAT BINDER
NON-SLIP FOOT REST

The W. H. Thomas Mfg. Co.
Dept. A
Spencer, Iowa
Sales Representatives
The Fulton Co., Milwaukee, Wis.



RELIO

The Van Norman
VALVO

Relio, an electric-drive wet grinder for pistons, pins, valves, bushings, \$175.
Valvo, an electric-drive bench grinder for valves, valve-seat reamers \$175. See page ads this paper.

Van Norman Machine Tool Co.
Springfield, Mass.



Johnson

SPARE TIRE LOCK

Made by
JOHNSON AUTOMOBILE LOCK CO.
DEPT. B, ST. LOUIS, U. S. A.



INLAND

COMPLETE PISTON SERVICE

A ring for every purpose—Spiral Cut, Oilless and StepSet—and a complete line of semi-steel Replacement Pistons and high-grade Piston Pins. Write for details.

INLAND PRODUCTS CO., INC.

Main Office and Factory

St. Louis, U. S. A.



Over the top on all four
with a
Rush Timer
FOR FORDS

W. S. Rush & Co., Mfrs., 112 N. Daly St., Los Angeles, Calif.
S. S. McClelland Co., Eastern Distributor, 1926 Broadway, N. Y. City
Rush Brake Shoes—Transmission Band Oilier & Cooler

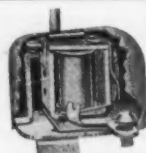
MR. DEALER

For quick, sure sales and big fat commissions, you can't beat the Dunn Products.

Counterbalances for Ford, Dodge, New Overland 4, and Chevrolet 490—Front and Rear Fender Braces for Fords—Motor Supports for Ford and Chevrolet 490—Hot Spot Manifold Heaters—Handy Luggage Carriers. All sure sellers—big profits to the dealers.

DUNN MANUFACTURING CO., 106 Main St., Clarinda, Ia.
Dunn Sales Co., 250 W. 54th St., New York

The GLB Protector



Saves your battery—protects your lights—prevents your generator from being damaged by over-heating. Guards charging line, cutout and ammeter.

Learn the interesting details.

Lupton, Hill and Lupton, Dayton, Ohio

GET ACQUAINTED WITH GASKO CEMENT

It's Better Than Shellac for Motor Gaskets
Send 25c in stamps for Trial Tube—Today.

VAN SICKLE MFG. CO., Lincoln, Nebr.



JACOBS CHUCKS INSURE ACCURATE DRILLING

Write for circular, "A Jacobs Chuck for Every Purpose."

THE JACOBS MANUFACTURING CO.
Hartford, Conn.

K-D Parallel Jaw
Valve Spring Lifters

Does Your Jobber
Carry K-D Specialties?

K-D MANUFACTURING CO.,



K-D No. 100
Cut-Out Pedal

Dealers Write NOW
Sending Jobber's Name

Lancaster, Penna.

KING QUALITY

ALL THE NAME IMPLIES

PISTON PINS

King Quality—highest in everything but price
Automotive Division

KING SEWING MACHINE CO. BUFFALO, N. Y.

THE CLEARING HOUSE OF THE MOTOR INDUSTRY. FOR PARTS, ACCESSORIES, TIRES, MACHINERY REBUILDING, REPAIRING, WELDING AND USED CARS. ALSO HELP AND SITUATIONS WANTED AND MISCELLANEOUS CLASSIFIED ADVERTISING

WE'VE GOT EVERYTHING

In the line of New and Used Auto Parts, Accessories and Supplies, for all makes and models of cars.

Engines; Transmissions; Clutches; Axles; Wheels; Rims; Tires; Radiators; Gears; Axle Shafts; Bearings; Magnets; Starters; Generators; Coils; Batteries; etc., etc.

Ours is the largest stock of its kind in the world. You will save time and money by getting in touch with us first whenever you are in need of anything in this line.

WARSHAWSKY & COMPANY

World's Largest Car Wreckers and Replacement Parts House.

1915-31 So. State St., Chicago, Ill.
No Branches Ph. Calumet 7315 No Branches

PARTS

NEW AND USED
for all makes of cars

QUICK SERVICE

AND

RIGHT PRICES

WRITE—WIRE—OR COME TO

FRANKLIN SALES COMPANY

200-202-204 North First Street, East
CEDAR RAPIDS, IOWA

NEW PARTS FOR ALL CARS

Axle Shafts, Bearings, Gears, Universal Joints, Starting Motors, Lighting Generators, Coils, Magnets, Wheels, Rims, Springs, etc.

Dealers Write for Special Bulletin

PURITAN MACHINE CO.
DETROIT, MICH.

PARTS

FOR NEARLY ANY MAKE OF CAR

At 25 to 75% Off List Price

Satisfaction guaranteed or money refunded

I. WOLF AUTO PARTS & TIRE CO.

"A Million Parts"

619 N. Illinois St. Indianapolis, Ind.

ANY PART for ANY CAR NEW or USED Send for Catalogue Cincinnati Auto Parts & Wrecking Co. 712-714 Walnut St. CINCINNATI, OHIO Parts our middle name

WICHITA AUTO WRECKING CO.

"The Old Reliable"

Offers you quick service, quality parts and absolute satisfaction—and our prices are a little lower. We are an old reliable house and all that implies. Our stock of parts is one of the largest in the country—from a 1907 one cyl. Reo to a 1921 Overland Four.

Wichita GIVE US YOUR NEXT ORDER Kansas

Are You Interested in Regrinding Cylinders?

The Heald Machine Company build a machine expressly for this work. Simple, self-contained, large capacity, and sold at a moderate price.

Regrinding is ideal for small machine shops, auto repair shops and welding concerns.

Let us send you a survey of what others are doing in this business.

The Heald Machine Company

61 New Bond St.

Worcester,

Mass.

STARTERS GENERATORS ARMATURES

Send them to KANSAS CITY

FORD GEN. ARMATURE, \$2.50

STARTER SERVICE ENG. CO.

815 E. 15th St. Kansas City, Mo.

GEARS & SHAFTS

New

for

TRANSMISSION AND AXLE
SILENT TIMING GEARS
FLY-WHEEL STARTER GEARS

All Shipments Made Same Day

GUARANTEED GEAR
SERVICE COMPANY

1714 S. Michigan Ave., Chicago, Ill. 208 Wells St. Milwaukee, Wis.

AUTO PARTS

Save 50 — 90%
2000 Models

NEW AND USED GEARS, AXLES, BEARINGS, SPRINGS, MAGNETS, GENERATORS, ETC. JOBBERS IN BANKRUPT AUTO SUPPLIES.

BRIGHTMAN AUTO EXCHANGE

321 Windsor Ave. HARTFORD, CONN.

PARTS

New and Used

for All Cars

Save 25 to 75%

AUTO SALVAGE & PARTS CO.
Oklahoma City, Okla., U. S. A.

DEALERS AND SALESMEN

Get our rock bottom prices and our exclusive territorial rights on

TIRES AND TUBES

THE ARMSTRONG TIRE CO.
1300 S. Wabash Avenue, Chicago, Ill.

ALUMINITE PISTONS and
Connecting rods for all
make cars

FORD SPEED SPECIALTIES

Special ALUMINITE racing
pistons for Ford motor
(12 oz.)

HIGH SPEED CAMSHAFTS
POWER-PLUS cylinder head
for Ford cars

IRON REPLACEMENT
PISTONS

Green Engineering Co.
DAYTON, OHIO

PATENTS

BOOKLET FREE HIGHEST REFERENCES
PROMPTNESS ASSURED BEST RESULTS

Send drawing or model for examination
and report as to patentability

WATSON E. COLEMAN, Patent Lawyer
624 F Street N. W., Washington, D. C.

Attorney-at-Law and Solicitor of Patents

C. L. PARKER

Formerly Member Examining Corps., United
States Patent Office

American and foreign Patents secured. Searches made
to determine patentability and validity. Patent suits
conducted. Pamphlet of instruction sent upon request.
McGill Building, WASHINGTON, D. C.

VAN NORMAN RADIAL GRINDER

Complete with set of attachments for grinding
ball bearings together with stock of oversize
balls and retainers. Write us for details.

REINHARD BROTHERS COMPANY
Minneapolis, Minn.

AUTO INDUSTRY MAILING LISTS

Send to headquarters for dependable lists of Automobile Owners, Dealers, Accessories, Garages, Tire and Battery Stations, Truck Fleet Owners, Bus Lines, Taxicab Companies. Write for catalog and prices.

MOTOR LIST COMPANY

Fourth & Grand Des Moines, Iowa 431 Howard St. Detroit, Mich.

Late model Duntley Timers for
Ford \$.75
Lee Motor Meter Lock, dozen..... 7.50
Lee Oil Gauge for Ford..... .25

E. A. BOWMAN, INC.

41 Harper Avenue Detroit, Mich.

All Phones:
West 4918

LAMMERT & MANN CO.

ESTABLISHED 1894

215-21 N. Wood St.
CHICAGO

EXPERT CYLINDER AND CRANKSHAFT RE-GRINDING

SPECIAL LIGHT WEIGHT
CAST IRON PISTONS

PISTONS—RINGS—WRIST PINS
SCORED CYLINDERS REPAIRED

AUTO PARTS

Nearly 3,000,000 Auto Parts.

Why buy new parts, when we can

SAVE YOU 50% to 75% off list?

Parts for all models, Maxwell, Overland, Stude-

baker, from 1910 to 1920, and others.

EUREKA AUTO PARTS & TIRE COMPANY

334 N. Capitol Ave. and 503 N. Illinois St.

Indianapolis Indiana

FORD GENERATOR and STARTER

ARMATURES REWOUND

\$1.50 EACH—TO DEALERS

Service and Workmanship Guaranteed

SHIP TO

GUARANTEE AUTO ELECTRIC CO.

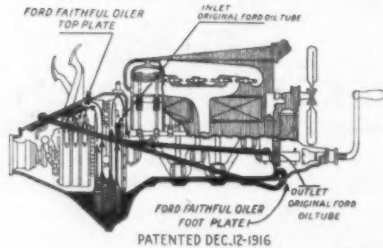
1840 WABASH AVE., CHICAGO

DISTRICT DISTRIBUTORS

wanted for fastest selling auto accessory on today's
market. Retailers for \$1.00. We want men to sell to
dealer on cash basis and to handle subdealers to sell
to consumer. Liberal discounts.

THE VALLEY SALES COMPANY

314 Wainwright Bldg. Saint Louis



"Ford Faithful" OILING SYSTEM

WHAT IT IS

An Auxiliary oiling device for Fords. Consists of an easily installed special top plate on transmission, an exterior oil tube and an outlet plate. It is designed to give ample lubrication to motor and transmission regardless of driving conditions.

WHAT IT DOES

By thoroughly lubricating the power plant, 50 per cent longer life is imparted to the motor and transmission bands. Burnt-out bearings, scored cylinders and big repair bills are eliminated. More power, greater oil and gasoline mileage is obtained, together with the satisfaction of having a quiet, powerful, economical Ford at all times.

Price \$5.75

DEALERS

Get our proposition. The Ford Faithful Oiler has no competition—patents being upheld, makes satisfied customers for your business and money for yourself.

W. O. THOMPSON MFG. CO.

330 MOUNTAIN VIEW ST.

PASADENA, CAL.

Index to the

The Advertisers' Index is published as a convenience and not as a part of the advertising contract. Every care will be taken to index correctly. No allowance will be made for errors or failure to insert.

Adjustable Bearing Co.....	124	Dalton & Balch.....	110
Ahlberg Bearing Co.....	123	Deddens, Wm., Mfg. Co.....	79
Air Reduction Sales Co.....	126	Dexter Rubber Co.....	86
Akron Sells Co.....	122	Diamond State Fibre Co.....	101
Albertson & Co.....	126	Donnelley, R. H., Corp.....	123
Allen-Bradley Co.....	125	Double Seal Ring Co.....	125
Allen Mfg. Co., The.....	73	Duesenberg Auto & Motors Co.....	127
Almond, T. R., Mfg. Co.....	60-61	Dunn Mfg. Co.....	124
Alvord Reamer & Tool Co.....	125	Durham, P. J., Co.....	122
American Autoparts Co.....	119		
American Bureau of Eng.....	60-61	Eagle Machine Co.....	118
American Grinder Mfg. Co.....	125	Earl Motors, Inc.....	122
Ames, B. C., Co.....	128	Eastern Mach. Screw Corp.....	63
Arrow Head Steel Prod.		Eclipse Machine Co.....	63
Co.....	82 & 83	Edison Mazda Lamp Works.....	Bk. Cov.
Associated Business Papers		Electric Machine Co., The.....	123
Inc.....	117	Everyday Piston Ring Co.....	123
Auburn Automobile Co.....	74 & 75		
Auto-Hone Co., The.....	113	Fedders Mfg. Co.....	124
Auto Spring Control Co.....	117	Ferry Mfg. Co.....	129
Automatic Elec. Devices Co.....	122	Fisk Tire Co., Inc., The.....	68
Autoquip Mfg. Co.....	125	Foster-Johnson Reamer Co.....	85
		Franklin Air Compressor	
		Works.....	127
Bantam Ball Bearing Co.....	115		
Beacon Visible Pump Co.....	122	Gates Rubber Co.....	100B
Bearings Co. of America.....	121	General Automotive Corp.....	123
Bear Tractors, Inc.....	127	General Storage Battery Co.....	119
Bell Mfg. Co.....	115	Gill Mfg. Co.....	122
Berill & Company.....	127	Globe Mach. & Stamping Co.....	118
Bethlehem Spark Plug Co.....	94 & 95	Goodrich, B. F., Rubber Co.....	2
Biflex Products Co.....	57	Gurney Ball Bearing Co.....	100
Bishop & Babcock Co.....	70 & 71		
Black & Decker Mfg. Co.....	60-61, 127	Hanes Rubber Co.....	100
Bonney Forge & Tool Works		Harvey Rim & Wheel Co.....	124
.....	60-61	Heald Machine Co.....	127
Borg & Beck Co.....	124	Higgin Mfg. Co., The.....	131
Bosch Magneto Corp., Amer.....	125	Hobart Bros. Co.....	122
Bosch, Robert, Magneto Co.....	110	Holmes, Ernest, Co.....	113
Bowser, S. F., & Co.....	128	Hoof, John C., & Co.....	127
Broderick & Bascom Rope Co.....	123	Huetter Mach. & Tool Co.....	100
Brown-Lipe-Chapin Co.....	127		
Brown-Lipe Gear Co.....	127	Indianapolis Pump & Tube Co.....	130
Brunner Mfg. Co.....	112	Indiana Rubber & Insulated	
Bullard Machine Tool Co.,		Wire Co.....	124
Inc.....	77	Indiana Watkins Mfg. Co.....	124
Bunting Brass & Bronze Co.....	76	Inland Products Co.....	122
Burd High Compression Ring		International Harvester Co.....	90
Co.....	124		
Burroughs Adding Machine Co.	2	Jacobs Mfg. Co.....	60-61, 122
Burton-Rogers Co.....	60-61, 81	Jenkins Vulcan Spring Co.....	84
		Jennings Corp.....	124
		Johnson Automobile Lock Co.....	124
		Johnson Bronze Co.....	100A
		Johnson Gas Appliance Co.....	127
Cadillac Motor Car Co.....	53	K-D Mfg. Co.....	122
Canedy-Otto Mfg. Co.....	125	Kant-Skore Piston Co.....	127
Champion Spark Plug Co.....	Ft. Cov.	Kauffman Metal Prod. Co.....	124
Chicago Solder Co.....	126	Kellogg Mfg. Co.....	60-61
Clearing House.....	129	Keystone Reamer & Tool Co.....	124
Coleman Lamp Co.....	126	King Sewing Mach. Co.....	122
Continental Auto Parts Co.....	60-61	Kissel Motor Car Co.....	124
Cooper Corp., The.....	4	Kokomo Rubber Co.....	84
Cooper Mfg. Co.....	109		
Correct Measure Co.....	125		
Courier Motors Co.....	87		
Curtis Pneumatic Mach. Co.....	121		

DE LUXE
Products

Guaranteed for 5
years — built to
outlast the car

Only \$3.50 Retail

ORDER DIRECT
SPECIFYING
JOBBER

The
DeLuxe
TIRE PUMP

Also
ARVIN HEATERS
DE LUXE,
DE LUXE VENTILATORS

INDIANAPOLIS PUMP & TUBE CO.
INDIANAPOLIS

Advertisements

Landis Tool Co.....	62 & 63	Sav-Oil Ring Mfg. Co.....	124
Laurel Motors Corp.....	120	St. Paul Welding & Mfg. Co.....	116
Long, E. C.....	123	Service Equipment Associates.....	60 & 61
Louisville Electric Co.....	120	Shawver Co., The.....	123
Lowe, W. D., & Co.....	122	Sparks-Withington Co.....	122
Lucas Pump & Tool Co., The.....	125	Starrett, L. S., Co., The.....	80
Lupton, Hill & Lupton Co., The.....	128	Stephens Motor Car Co.....	132
Lycoming Motors Corp.....	78	Stevens & Co.....	60-61, 124
McQuay-Morris Mfg. Co.....	100	Stewart, F. W., Mfg. Corp.....	116
Malco Products Corp.....	121	Stewart-Warner Speedometer Corp.....	1
Manley Mfg. Co.....	60-61, 123	Stone Mfg. Co.....	98 & 99
Martin, T. A., Equip. Co., Inc.....	122	Storm Mfg. Co.....	122
Meacham Gear Corp.....	119	Stromberg Motor Devices, Inc.....	125
Micro Machine Co.....	119	Stutz Motor Car Co.....	102
Mid-West Mfg. Co.....	60-61	Sunderland Mach. & Supply Co.....	116
Milwaukee Die Casting Co.....	67	T-N-T Spark Plug Co., The.....	125
Monogram Lens Corp.....	124	Tarkington Motors Co.....	126
Monroe Auto Equip. Mfg. Co.....	104	Thermoid Rubber Co.....	125
Moore & Moore, Inc.....	117	Thoma & Son, Inc.....	EndCov.
Mossberg, Frank, Co.....	60-61	Thomas, W. H., Mfg. Co.....	128
Mosler Metal Prod. Corp., The.....	97	Thompson, W. O., Mfg. Co.....	130
Motorblocc Corp.....	126	Thomson-Friedlob Co.....	118
Motor Products Co., The.....	126	Threan & Davis Co., The.....	126
Motor Transport.....	90 & 91	Trindl Co.....	112
Multibestos Company.....	64	Turner Mach. & Mfg. Co.....	123
Murray Tire & Rubber Co.....	100C	Unico Motor Prod. Corp.....	111
Natty, L. J., Co.....	114	U. S. Asbestos Co.....	128
Nash Motors Co.....	6	U. S. Auto Supply Co.....	107
National Collapsible Rim Corp.....	124	U. S. Ball Bearing Co.....	93
New Departure Mfg. Co.....	120	U. S. Chain & Forging Co.....	66
New York Wire & Spring Co.....	126	Universal Equip. & Supply Co.....	123
No-Leak-O Piston Ring Co.....	126	Universal Industrial Corp.....	127
Nordyke & Marmon Co.....	7	Universal Machine Co.....	127
Norman Mfg. Co.....	119	Van Norman Mach. Tool Co.....	128
Norwalk Auto Parts Co., The.....	126	Van Sickle Mfg. Co.....	128
Oxweld Acetylene Co.....	60-61	Walden-Worcester, Inc.....	56
Packard Electric Co.....	122	Waller Mfg. Co.....	131
Parker, Chas., Co.....	118	Warner Gear Co.....	126
Peerless Motor Car Co.....	84	Waukesha Motor Co.....	120
Pep Mfg. Co.....	69	Wayne Tank & Pump Co.....	127
Perfection Gear Co.....	125	Weaver Mfg. Co.....	60-61, 126
Peters Eng. Co.....	126	Webber, P. H., Co.....	122
Pomeroy Electric Co.....	122	Weidenhoff, Joseph.....	60-61, 124
R. & V. Motor Co.....	58 & 59	Welker Mfg. Co.....	124
Rand McNally & Co.....	114	Whitney Mfg. Co.....	121
Red Giant Tool Corp.....	127	Wilcox Screw & Mach. Works Inc.....	125
Reflex Ignition Co.....	118	Wilkening Mfg. Co.....	127
Reid Air Spring Co.....	128	Williams Bros. Aircraft Corp.....	3rdCov.
Rickenbacker Motor Co.....	72	Wisconsin Motor Mfg. Co.....	8
Robertson Bros. Mfg. Co.....	127	Wright Manufacturing Co.....	60-61, 108
Roland & Koch.....	124		
Ruby Chemical Co.....	120		
Ruby Mfg. Co.....	124		
Rush, W. S., & Co.....	128		
Russell Burdall & Ward Bolt & Nut Co.....	96		

Sell a Good Visor!

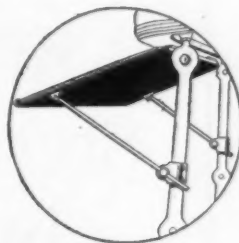
Visors are accepted today as needed car equipment—therefore sell a good one—one that you can honestly recommend and one that you can make money on.

The Higgin visor fills the bill—because of its unvarying quality it has come to be regarded as the Standard.

It is staunchly constructed and handsomely finished and it will stand up and retain its good looks. You can sell it and continue to sell it.

Besides a worthwhile discount, Dealers and Jobbers are offered protected territories and sales getting assistance. Write for the details.

The Higgin Mfg. Co.
Automotive Division
Newport, Ky.



A rigid, durable visor that is installed in 10 minutes, easily and quickly adjusted, made for most cars—and is suitable for the finest.

The HIGGIN VISOR

What Good Are Profits If You Lose Them on "Make Goods"?

To make a profit on an overhaul job is one thing—to lose it by having to correct trouble on your own time is another thing. You can protect your profits and insure the good will of your customers by checking the parts before they are replaced. In this way a WALLER jig will pay for itself in a very short time.

WALLER CONNECTING ROD AND PISTON ALIGNER

Detects the slightest bends or twists in connecting rods, pistons worn out of round or bored crooked or any misalignment in the piston and rod assembly. Operates within limits of .001 in. \$16.00 complete with Ford size arbor. Bushings for other size crankshafts, \$1.00 each.

Your jobber will supply you. Jobbers—Write for full information.

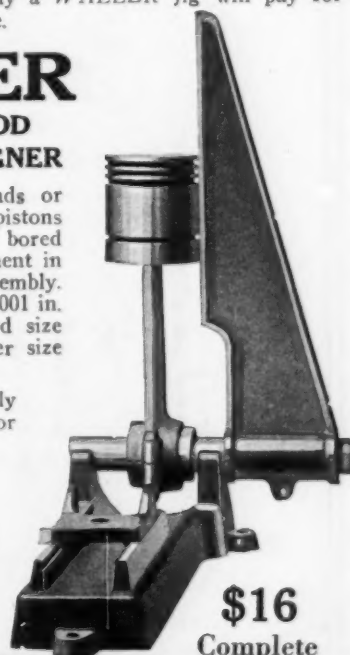
Waller Mfg. Co.

Dubuque, Iowa

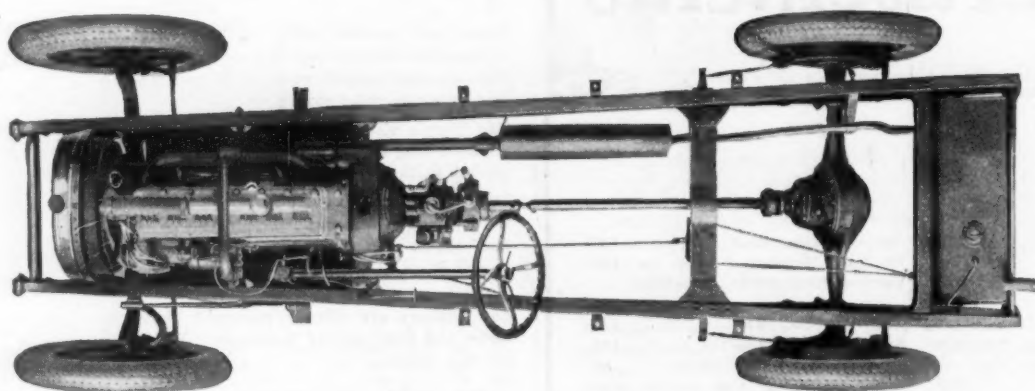
(Formerly Oelwein)

The Clucker & Hixon Co.
Sales Representatives

47 Murray St. 52 E. 11th St.
New York Chicago



\$16
Complete



Stephens chassis value unmatched by any car in its price group

Good looks still sell *some* motor cars. But the majority of buyers now know and are demanding sound design and lasting quality. The 1923 Stephens chassis pictured above embodies the standard units and Stephens features listed below. Compare them with any other car on the market. Then write Moline for full information and you'll pick the Stephens as your line for 1923 and 25 years to come:

Delco ignition, starting, lighting with 113-ampere hour battery.

Timken axles, highest grade, with extra large factors of safety.

Gemmer steering gear, over-size.

Fedders radiator. Rigid, thin core.

Mather chrome vanadium springs. Front and rear springs harmonized.

Stromberg special 1 1/4-inch carburetor.

Borg & Beck clutch. Pressure oiling for throw-out bearing.

Saal high-pressure chassis oiling.

Oil-lubricated universal joints on transmission shaft. Dust-proof.

Kellogg power-driven tire pump.

Burly, big Fisk cords, all non-skid.

Two distinct models and seven individual new body types.

Low-swung bodies—intriguing lines—distinctive colors—lasting finishes.

Two wheel bases: 117 and 124 inches.

The most efficient and economical 6-cylinder motor built in America.

Valves over-head and extra large.

Intake manifold inside cylinder-head forms "cracking" and tempering chamber.

Cylinders ground, semi-spherical combustion chamber is full machined.

Forced lubrication to all engine bearings with vacuum control.

Straight-side frame with five cross-members, two torsion tubes.

STEPHENS MOTOR CAR COMPANY, INC., Moline and Freeport, Ill.

TOURING CAR, 5-PASS., \$1295

TOURING SEDAN, 5-PASS., \$1595

SEDAN, 5-PASS., \$1895

ROADSTER, 2-3-PASS., \$1345

TOURING CAR, 7-PASS., \$1685

SEDAN, 7-PASS., \$2385

SPORT "FOURSOME," 4-PASS., \$1985

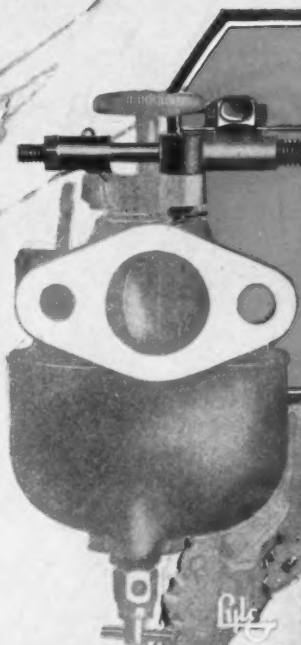
ALL PRICES F. O. B. FREEPORT, ILL.

STEPHENS

Motor  Cars

Write Moline today for actual-color catalogue, specifications and your share of the profits.

POSITIVE *Adjustment*



IT is the *positive adjustment* of the WILLIAMS ACCELERATOR that wins the enthusiasm of your customers once you have demonstrated it to them.

Fixed with a vice-like clamp that absolutely prevents loosening, the cable adjustment will withstand any jar and vibration.

The importance of this feature is realized by over a million satisfied WILLIAMS ACCELERATOR users.

Installation is simplicity itself. Only three easy connections are required, the WILLIAMS ACCELERATOR being completely adjusted for immediate attachment.

Order through your regular jobber.

New 1923 advertising matter now ready for distribution. Order today.

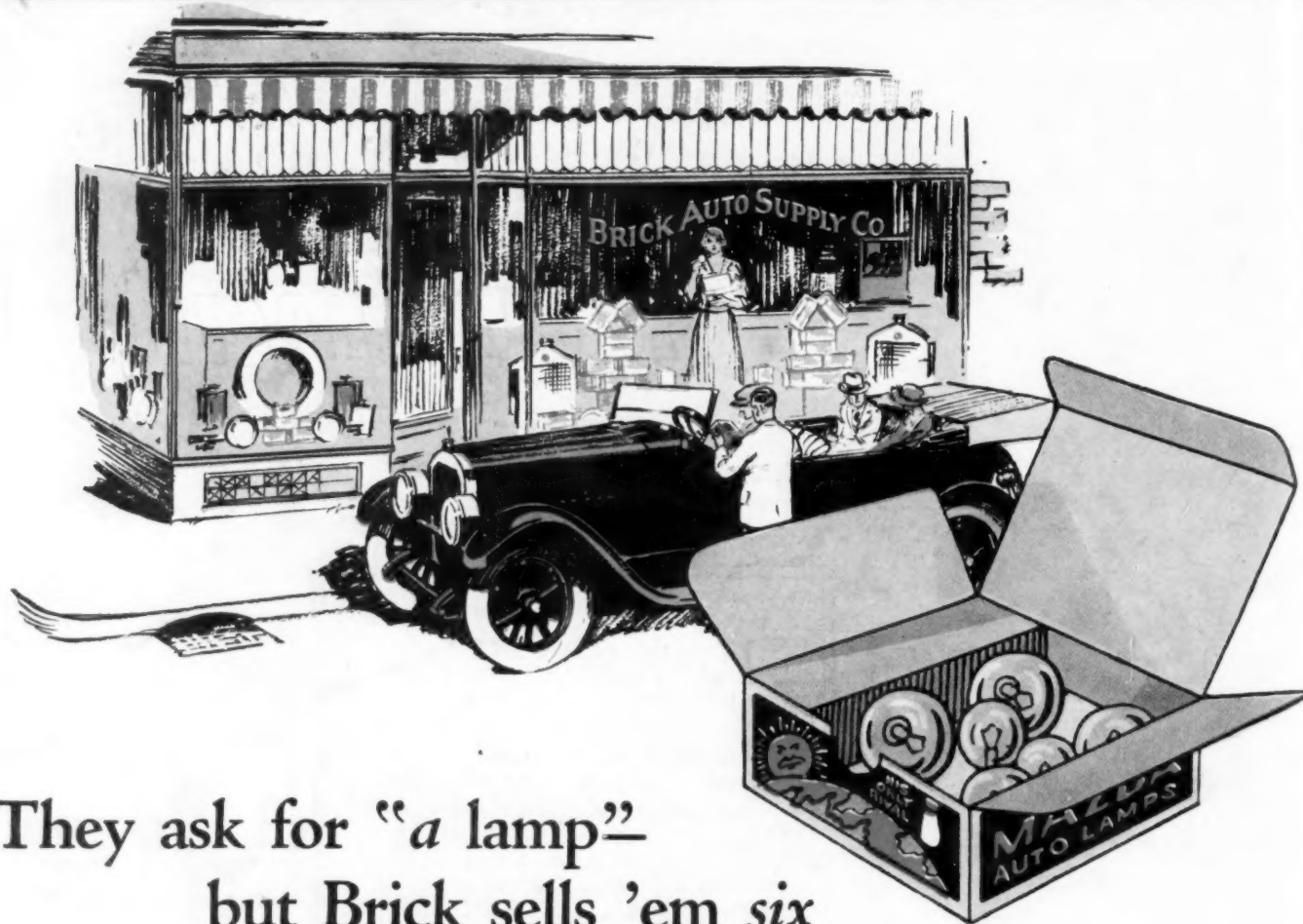
WILLIAMS BROS. AIRCRAFT CORP.

1211 Van Ness Ave.,
San Francisco, Calif.



PRICE
AT YOUR DEALER
\$3⁰⁰
AND WORTH
IT

TRADE
WILLIAMS ACCELERATOR
MARK
for FORD CARS



They ask for "a lamp"—
but Brick sells 'em six

BEN BRICK, of the Brick Auto Supply Company, Paterson, N. J., is another dealer who is making big profits out of Edison MAZDA Auto Lamps. *He sells them by the kit.*

"Your 6-lamp kit is greatly increasing my lamp business," he writes. "Recently I sold kits to 30 out of 55 customers who asked for 'a lamp.' That means that I sold 150 *additional* lamps by the use of the kit."

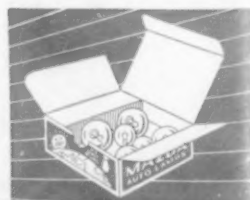
Figure his profit for yourself—a profit made without extra effort. He just shows the kit, explains its convenience and "asks 'em to buy."

Be the Ben Brick in your town or neighborhood. Write today to your jobber for information about the Edison MAZDA Lamp Auto Kit, the new Lamp Stock Cabinet and our plan of dealer sales co-operation. It will help you sell six lamps where you are now selling one.

Edison Lamp Works of General Electric Company, Harrison, N.J.



EDISON
MAZDA LAMPS



A GENERAL ELECTRIC PRODUCT